FOUNDRY TRADE JOURNAL
Established 1902
WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL

Vol. 86 Thursday, March 24, 1949 No. 1699

49, Wellington Street, London, W.C.2
'Grams: "Zacatecas, Rand, London"
'Phone: Temple Bar 3951 (Private Branch Exchange)
PUBLISHED WEEKLY: 26s. per annum (Home and Overseas)

The Institute's Proceedings

The new volume of the Proceedings of the Institute of British Foundrymen, number XLI, does much credit to the editor, Mr. G. Lambert, and the binding, too, seems a little better than has been the case in recent years. In general, we think the level of the Papers shows a distinct improvement. The nature of the contents varies year by year, with a tendency in the direction of the inclusion of more Papers covering the needs of the whole of the founding industry. Into this category enter contributions covering sands, organisation, refractories, amenities, costing and so forth. This type of Paper in this volume embraces eleven titles. In order of quantity, cast iron, with thirteen Papers, comes first, with subjects ranging from the highly theoretical down to the most severely practical. On the non-ferrous side, only four Papers are included, and it is germane to suggest that this needs strengthening—a matter which we understand is having the attention of the literary committee. Three Papers cover various phases of steelfoundry practice, and only one—but that a masterly effort by Dr. Schwartz—deals with malleable.

Scientific knowledge of cast iron has been materially advanced by the Papers written by Morrogh and his colleagues at the British Cast Iron Research Association and the one included in this volume is an excellent record of the progress so far achieved. Another outstanding Paper is by E. Longden, wherein the author has been successful in producing a graph for camber based on sound experimental results. This will serve a really useful purpose for those engaged for many years on the making of heavy machine-tool castings and the like. The way is shown for the orderly production of liquid cast iron in a well-written Paper by W. W. Braidwood. In his Paper, Tottle disclosed new knowledge capable of practical application for the relief of inherent stresses in castings. Hurst and Dr. Rigby, in their contribution, broke new ground in giving data as to the amount of gases existing in cast iron. The information is at present unutilisable, but to future generations of foundrymen it will be as commonplace as is existing knowledge on the effect of the normal elements on cast iron. The feature which we like about Mr. D. H. Young's Paper on the manufacture of large marine castings is its clarity as a description of the present state of the art. Without such information, past accomplishments become just mere uncorroborated subjects of gossip in hotel lounges and four-ale bars. His namesake, Mr. A. Young, makes a different kind of contribution, his story being the creation of an organisation entirely devoted to the production of one casting—a bath tub. The growth of this enterprise, now making 2,000 units per week, makes interesting reading.

Lack of space precludes us from commenting on the many other Papers included in this volume of Proceedings, but, like its forty forerunners, it mirrors very faithfully the orderly progress which the industry has made. The standard of editing, which includes indexing, is indeed high and compares well with the publications issued by the older, historic, technical institutions of this country. Though it is not generally recognised, the Proceedings of the Institute is still the major factor in the recruitment of new members without which, to use a trite piece of nonsense, the organisation must "peter out."

Contents

The Institute's Proceedings, 251.—National Foundry College, 252.—Steelfounders' Productivity Team, 252.—Forthcoming Events, 252.—Latest Foundry Statistics, 252.—A Decade of Progress in British Ironfounding, 253.—Annual Meeting of the Scottish Branch, 261.—Institute of British Foundrymen, 263.—"Cast Down," 265.—New Platform Truck, 265.—Publication Received, 265.—Engineers and Public Life, 265.—Proposed New Regulations for Shot Blasting, 266.—Correspondence, 266.—Exhibitions for Training Purposes, 266.—British Industry in 1949, 267.—Anglo-German Trade, 268.—Contracts Open, 268.—Increases of Capital, 268.—News in Brief, 269.—Zinc Corporation's Proposals, 270.—Anglo-American Productivity, 270.—Export Licensing Control Changes, 270.

National Foundry College

The importance of the work of the National Foundry College, established at the Wolverhampton and Staffordshire Technical College, about a year ago, was stressed by Mr. P. H. Wilson, vice-chairman of the college governing body, who also is president of the British Cast Iron Research Association and immediate past-president of the Institute of British Foundrymen. He was welcoming to the college representatives of the trade unions, including Mr. J. Gardner (general secretary) and Mr. R. W. Cassasola (Executive Council of the Amalgamated Union of Foundry Workers), Mr. C. W. Hallett (A.E.U.), Mr. H. Riley (Metal Mechanics), and Mr. G. Reeve (Patternmakers' Association).

Mr. Wilson explained that the aims of the college were those which inspired the setting up in 1935 at Birmingham of the British Foundry College, whose work came to an end at the outbreak of war. The immediate object was to turn out 25 fully-qualified men each year. The necessity of supplies of good castings, whether of iron, steel or non-ferrous materials, to a number of industries was mentioned. The production of these castings could be brought about only by an ever-improving knowledge and technique on the part of those responsible for the design, construction and operation of foundries. Towards the attainment of this object Mr. Wilson called for the willing co-operation of the foundry industry. Dr. W. E. Fisher (principal of the Technical College) and Mr. F. Lonsdale Mills (Director of Education for Wolverhampton) gave other details and, later, the deputation, under the direction of Mr. J. Bamford (head of the foundry college), visited the foundry and also the students' hostel at Tor Lodge, Tettenhall Wood.

Steelfounders' Productivity Team

During their first week in New York, the steelfounders' team will visit the American steelfoundries in Newark, New Jersey, and the Copper Alloy Foundry Company in Hillsdale, New Jersey. The team will leave New York on March 20 for Chicago and will go from there to Milwaukee for a week. The W.J. Grede Foundry & Machine Company in Milwaukee is arranging for visits to its own plant and those of several other foundry operators in the Milwaukee area. Leaving Milwaukee on March 26 the team will go to Dearborn, Michigan, for a week. Visits will be made to the Ford Foundries in River Rouge, Michigan, and Windsor, Ontario, and also to the works of the Michigan Steel Castings Company in Detroit and to several automobile plants. The week beginning April 4 will be spent in the Chicago area, several foundries there, including that of the Continental Foundry & Machine Cast Company in East Chicago, will be visited. On April 5, the team will meet members of the Anglo-American Council in Chicago, at which time the Council members will be on an inspection tour of the United States Mid-West area.

(Concluded at the foot of column 2.)

Arrangements have also been made for the team to visit the Battelle Memorial Institute in Columbus, Ohio, on April 8. It will then spend several days visiting foundries in the Central Ohio district, and on April 14 will begin a five-day stay in the Philadelphia area. The group will arrive in Washington for conferences on April 20. They will return to New York to sail for home in the Queen Elizabeth on April 28.

Forthcoming Events

(Secretaries are invited to send in notices of meetings, etc., for inclusion in this column.)

MARCH 28.

Institution of Works Managers.

Glasgow Branch:—"The Supervisory Grades as a Link between Management and Men," by G. F. Satow, at the Institution of Engineers and Shipbuilders in Scotland, Glasgow, at 7 p.m.

Sheffield Branch:—"Construction of Wage Rates," by A. G. Corben, at the Royal Victoria Station Hotel, Sheffield, at 7 p.m.

MARCH 29.

Leicester Branch:—"Foremanship," by F. E. Chappell, at the College of Art and Technology, Leicester, at 7 p.m.

Institution of Production Engineers

Luton Section:—"Jet Engines," a lecture at the Town Hall, Luton, at 7 p.m.

MARCH 30.

Halifax Graduate Section:—"Metallurgical Factors Influencing the Machineability of Steels," by L. W. Johnson, at the Technical College, Huddersfield, at 7 p.m.

Institute of British Foundrymen.

London Branch:—"What is Acicular Cast Iron?" by W. W. Braidwood, at the Waldorf Hotel, Aldwych, London, W.C.2, at 7.30 p.m.

MARCH 30, 31 and APRIL 1.

The Institute of Metals.

Annual General Meeting at the Institution of Mechanical Engineers' Storey's Gate, London, S.W.1, commencing at 10 a.m. on March 30 and 31, and at 4, Grosvenor Gardens, London, S.W.1, on April 1, commencing also at 10 a.m. (Programme printed in the JOURNAL, January 20.)

MARCH 31.

Leeds Association of Engineers.

"Man Management and its Effect on Production," by Lt.-Col. C. W. Mustill, M.B.E., at the Hotel Metropole, Leeds, at 6.45 p.m.

APRIL 1.

Keighley Association of Engineers.

"Machine-tool Lubrication," by A. E. Lawson, in Devonshire Buildings, Devonshire Street, Keighley, at 7.30 p.m.

Institution of Production Engineers.

West Wales Sub-section:—Film, "Patterns and Progress at Ebbw Vale," at 7.30 p.m. Details to be obtained from the Secretary.

Latest Foundry Statistics

The February Bulletin of the British Iron and Steel Federation shows a reduction in the numbers at work in ironfoundries. On January 8, 1949, the total number was 149,587, as against 150,981 on December 4, a reduction of 1,394 made up of 1,073 men and 321 women. In steelfounding, on the other hand, the labour force increased from 19,347 to 19,562. Steel for steel castings remained stationary at a weekly average output of 1,310 tons.

A Decade of Progress in British Ironfounding*

A Factual Summing-up which discloses modern trends

By W. W. Braidwood

(*Slightly abridged.*)

Progress in British Standards for Iron Castings

Despite the handicaps imposed by a long, exhausting and desperate war, British ironfounding technique has made greater advances in the last ten years than in any earlier period of equal length. The steady and considerable rise in the requirements of the British Standards covering grey-iron castings gives some indication of this progress. At the outset the highest specification called for a tensile strength of 11 tons per sq. inch. In the course of 1938, B.S.S. 786 was issued. This covered three grades of high-duty cast iron with minimum tensile strengths of 14, 17 and 20 tons per sq. in. In 1941, an additional grade was introduced, for which a minimum tensile strength of 23 tons per sq. in. was stipulated, and in May, 1948, a new specification, B.S.S. 1452, was issued, covering high-duty irons with minimum tensile strengths up to 26 tons per sq. inch. A further development was the introduction, in 1947, of a standard test for determination of impact strength (B.S.S. 1349). The development of this test has been described.[1] These advances are the result of all-round improvement in foundry technique, particularly of better melting practice and more widespread use of steel scrap, refined irons, alloys and inoculants, allied with sounder ideas on gating and feeding.

Melting Practice

The faithful cupola has consolidated its position. Earlier, there were signs of a move from the cupola to other melting units, particularly rotary furnaces, for production of high-duty and special cast irons. This trend has lost impetus, and because of the greater cost of melting, the inability to utilise steel scrap in quantity and the difficulty, in furnaces of certain designs, of controlling carbon and maintaining it at adequate levels; many rotary furnaces are now in only irregular use.

Cupola Operation and Design

This renaissance of the cupola has been due not so much to changes in design as to a rising general standard of operation. During the period under review the essentials of a good melting practice have repeatedly been stressed, and one Paper in particular has done much to increase knowledge of what happens inside the cupola. In a bold investigation, Rambush and Taylor[3] on four occasions interrupted production melts in mid-blow and water-quenched the cupola contents, and subsequently removed the materials piece by piece and recorded all observations. Their Paper should be studied in its entirety together with the excellent discussion which emphasised points overlooked by the authors. The main teachings are:—

(*a*) However carefully materials are charged, their relative positions are not maintained in the cupola. Size and shape of the metallic pieces govern their manner of descent.

(*b*) Time necessary for complete melting of the different metallic constituents of the charge is deter-

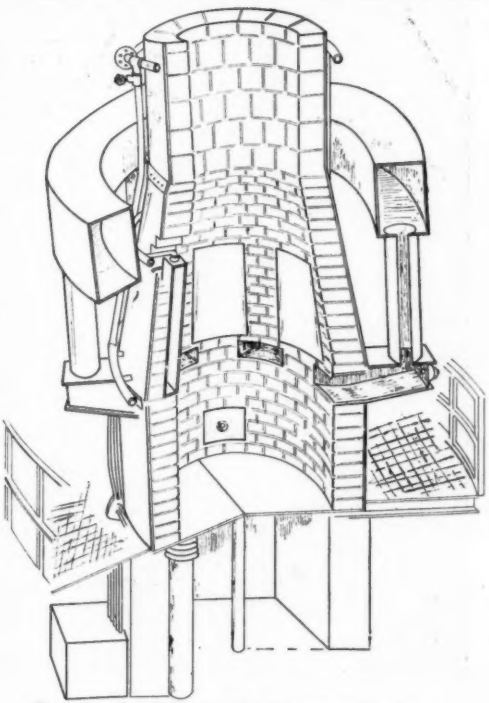


FIG. 1.—DESIGN OF WATER-COOLED CUPOLA.
[*Courtesy of The Ford Motor Company*]

* A paper presented to the 1948 Annual Meeting of the *Association Technique de Fonderie*, Mr. A. le Thomas and Mr. V. C. Faulkner presiding. Later given before the Falkirk Section of the Scottish Branch of the Institute of British Foundrymen. The author is on the Research and Development Staff of the Mond Nickel Company, Limited.

Progress in British Ironfounding

mined by their shape and weight, as well as by their melting points.

(*c*) Due to the formation of a "slag ledge" immediately above tuyere level, the "active melting zone" moves towards the centre of the cupola cross-section as melting progresses.

(*d*) Steel scrap travels further down the cupola before being melted than does cast iron of similar section.

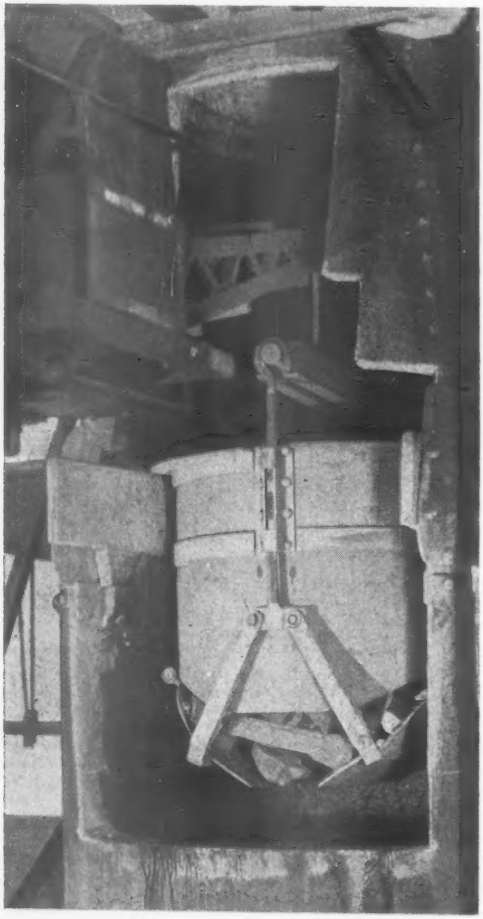


FIG. 2.—MECHANICAL CHARGING OF CUPOLAS BY SELF-OPENING BOTTOM-DISCHARGE BUCKET.
[Courtesy of Babcock & Wilcox, Limited]

(*e*) Rate of carbon-absorption by steel scrap is slow in the solid state, but rapid as the surface layers begin to melt.

(*f*) Coke-size is reduced during descent by combustion and by crushing under the weight and movement of the burden. Despite the cellular nature of coke, combustion takes place almost entirely on, or near, the outer surface. Reduction in coke-size is most pronounced in the "bed," especially in the centre of this zone, and particularly immediately above and just below the tuyeres.

Hot-blast and Special Cupolas

Continued thought has been given to the use of heated blast in cupolas and, although developments have lagged behind those reported from America and the continent, some progress has been made. In 1940, a design which makes use of an independent generator for supply of pre-heated air and incompletely-burned

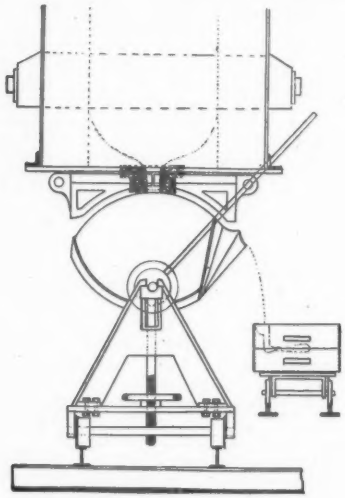


FIG. 3.—THE WALBRO CUPOLA.

gas to the cupola tuyeres was patented[3] by Longden, who later prepared a comprehensive survey of the known hot-blast systems.[4] A different design which embodies a pre-heating chamber in the upper part of the cupola shaft, has given good service over several years on high-steel content, alloyed iron charges, the operating periods being 8 to 10 hrs. each.[5] In a further patented design the air is passed through an annular chamber extending some distance above the tuyeres, so cooling the thin refractory lining in the melting zone and heating the blast.[6]

The slow development of hot-blast cupolas in Britain is due to the moderate size of the average cupola and the relatively short "blows." Nevertheless, the known

advantages of heated blast, namely, fuel economy, lessened sulphur pick-up, lower melting loss, hotter metal and greater uniformity in operation, with thermal efficiency raised from around 35 to about 55 per cent., indicate that conversion of the larger British cupolas would be justified.

The application of oxygen-enriched blast to the cupola has not yet been attempted on a production scale in Britain. The substantially increased melting rate, higher metal temperature, economy of fuel and easier operation of the cupola which are claimed to accompany oxygen additions of from 3 to 8 per cent., seem likely, however, to promote development within the next few years.

Interesting studies of blast-distribution were presented by Taft and Hallett[7] in their description of the "Pari-Blast" system, which uses a high wind belt from which the blast is conducted to the individual tuyeres by separate down-pipes, each fitted with a flow-meter and a pressure-gauge. This gives exact control over blast-flow, and equal distribution can be ensured. The Author has seen the original cupola in operation and the results are undoubtedly good.

Mention should be made of one particularly interesting modification in design,[8] which is illustrated in Fig. 1. That part of the cupola which contains the bed coke is in the form of a truncated cone. The wall tapers downwards and outwards from the parallel stack to the level of the tuyeres and this sloping wall contains water-cooled panels set flush with the inner surface of the brick lining. As part of a duplexing plant, a basic-lined cupola of this design is in regular use in a large iron foundry, where it supplies molten low-sulphur iron to an electric-arc furnace.

This design is claimed to permit longer periods of operation, with less erosion of the lining and more complete control of slag composition. These latter advantages are most important in basic-lined cupolas in which the refractory materials are expensive and slag control is imperative if effective de-sulphurisation and de-phosphorisation are to be ensured.

Basic Linings

An earlier Patent from the same source[9] had covered the process for controlling sulphur content by melting in a cupola lined with basic refractory material, and the theory and practice of melting in the basic-lined cupola has been described in a most interesting Paper by Renshaw.[10] The main difficulties encountered in providing a basic lining were overcome by use of stabilised dolomite clinker, available as bricks, as ramming material, and as cement for patching purposes.

Details of melts containing from 20 to 100 per cent. of steel showed that by maintaining a suitably basic slag and keeping iron and manganese oxides low by avoidance of over-blowing, sulphur contents consistently below 0.06 per cent. were obtained, regardless of the nature of the charge. Use of a continuous tap-

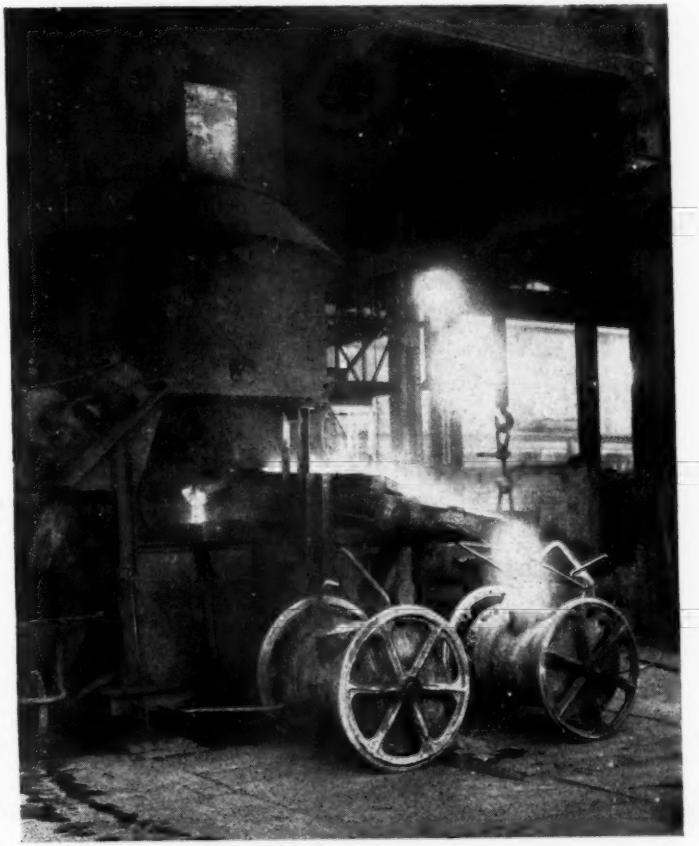


FIG. 4.—SELF-SLAGGING CONTINUOUS-FLOW CUPOLA SPOUT IN OPERATION.
[Courtesy of Babcock & Wilcox, Limited]

Progress in British Ironfounding

ping system, designed to maintain a deep layer of slag in the cupola well was described and recommended. It was reported that a basic-lined cupola of 36 in. dia. had then melted under production conditions more than 3,000 tons of metal, and it is known that two other cupolas with basic linings were to be in operation elsewhere before the end of 1948.

Removal of sulphur and phosphorus in the basic cupola and by ladle treatment was studied by Committees of the Institute of British Foundrymen. From their Reports,[11 12 13] which contain a wealth of detailed information, the following main findings are derived:—

In irons containing silicon up to 0.2 per cent., melted under oxidising conditions and in association with suitable basic slags, removal of phosphorus in amounts up to 50 per cent. of the initial low-phosphorus content is possible. Since, however, de-sulphurisation is most effective when conditions are non-oxidising, efficient removal of sulphur and phosphorus simultaneously is not possible, though some sulphur is removed even when conditions favour de-phosphorisation. By soda-ash treatment in basic-lined ladles using the double-pouring method 75 to 85 per cent. of the initial sulphur content of low-silicon iron can be removed with simultaneous removal of appreciable amounts of phosphorus. Addition of iron oxide with the soda ash favours removal of phosphorus but reduces the efficiency of de-sulphurisation.

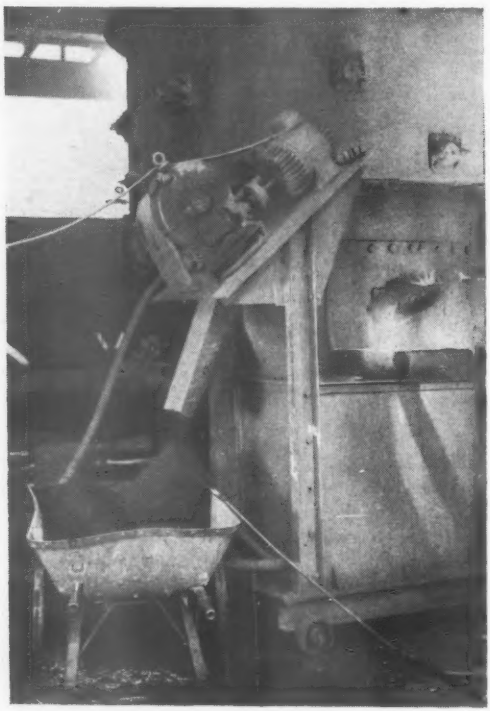


FIG. 5.—NOVEL UNIT FOR GRANULATION OF SLAG.
[Courtesy of Babcock & Wilcox, Limited]

Charging and Tapping

Mechanical methods of charging have come into increased use with tilt-charging favoured. This procedure has the advantages of convenience and low cost but gives poor distribution of materials across the cupola. Moreover, the insertion of cast-iron blocks in the opposite wall of the cupola to the charge-skip opening is usually necessary, in order to withstand the shock of discharge. In the Author's opinion charging by self-opening bottom-discharge bucket is much to be preferred, although first cost is greater. The operation of a large plant so equipped has been described[14] and Fig. 2 illustrates the procedure.

The traditional methods of intermittent tapping and botting of the metal stream have in many instances been superseded. In 1938 a description was given[15] of the unique design of cupola shown in Fig. 3. This has no well; metal and slag flow continuously through an aperture in the bottom into a tilting receiver positioned underneath. The receiver has a teapot spout for delivery of clean metal into ladles or directly into moulds on a conveyor. The receiver is tilted back from time to time for discharge of slag. About thirty installations have been made in British foundries.

The syphon-brick system described by Dunning[16] has become popular and the use of self-slagging continuous-flow spouts has increased considerably, together with improved methods for collection and disposal of slag. Fig. 4 shows a front-slagging spout in operation on an 8-tons per hour cupola melting for 10 hours per day. A neat slag-disposal equipment which is used at this cupola is illustrated in Fig. 5. The slag flows steadily from the side of the spout into a water tank from which a conveyor raises the granulated slag and delivers it into the waiting barrow. The material is used as ballast in concrete mixtures.

Cupola Charges and Ladle Additions

A further feature of this ten-year period has been the expanded use of the so-called "refined irons." These are usually prepared by the cupola-melting of charges containing 50 per cent. or more of steel scrap, the balance consisting of suitable pig and cast iron. These strong irons, with carbon in the range 2·6 to 3·2 per cent. and silicon and phosphorus to suit individual requirements, are available from several sources on a considerable scale. By the use of such material many foundries of modest size and with moderate standards of technical control are enabled regularly to produce high-duty irons. Advances have simultaneously been made in the development and application of ladle additions. New materials of low melting point and ready solubility have been introduced,

together with various exothermic compounds. Consequently, many foundries have modified their practice from the traditional method of tapping a series of different irons (in accordance with a pre-arranged pouring programme), to that whereby the cupola delivers metal of constant composition, which is inoculated and/or alloyed at will by spout- or ladle-additions in practical amounts to suit founding or service requirements. This procedure, fully described in a recent paper,[17] is of particular value to foundries required to produce large quantities of a variety of castings from moulding machines.

Ancillary Furnaces

There has been steady increase in the numbers of ancillary melting units. These fall into two main classes:—(*a*) rocking electric furnaces of the indirect-arc and carbon-resistor types, and (*b*) crucible furnaces of the tilting type, generally oil-fired. These are used for production of austenitic and other special irons. The greater cost of operation is partly offset by more efficient utilisation of expensive materials, and, where duplexing methods are possible, particularly economical use can be made of such units. Twigger[18] has provided a wealth of operational data and Fig. 6 shows an indirect arc furnace of 400 lb. capacity which is regularly producing Ni-Resist, Nicrosilal and Ni-Hard by direct melting and by duplexing methods. The oil-fired tilting crucible furnace is less expensive to install and is a useful unit in any foundry. The 400 lb. furnace shown in Fig. 7 has melted more than a thousand tons of austenitic cast iron since its installation ten years ago.

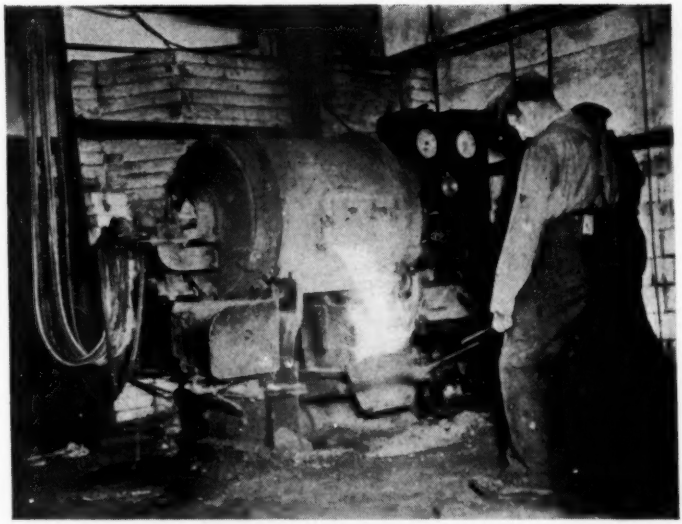


FIG. 6.—400-LB. ROCKING-ARC FURNACE IN OPERATION.
[Courtesy of John Williams & Sons (Cardiff), Limited]

Control Tests

Empirical control methods have been widely adopted and excellent guidance has been given by Sub-committee T.S.6 of the Institute of British Foundrymen, whose report[19] gives complete information on available specimens and methods, with recommendations covering their application. Such tests enable the foundryman to decide, before the moulds are poured, whether or not the metal shows the characteristics known by experience to indicate suitability for the purpose and a "running commentary" is always so much more useful than a "post-mortem examination"!

Shrinkage

A report on shrinkage by A. A. Timmins, of the British Cast Iron Research Association, first issued as a confidential communication in 1941, was subsequently, in response to general request, made available in printed form under the title "Some Factors Affecting the Formation of Shrinkage Defects in Cast Iron."[20] This excellent piece of work considerably increased the understanding of the mechanism of solidification and aided the development of improved technique. Though its consideration was mainly theoretical, its deductions were backed by sound experimental evidence and the report contains many photographs illustrating separate types of porosity and demonstrating the influence of variations in carbon, silicon and phosphorus contents on the soundness of unfed spherical castings. This report deserves detailed study by all foundry technologists.

Gating and Feeding Technique

A fascinating Paper by Fry[21] described the use of cine-radiographic methods for observation of the flow of metal in the mould and the formation of cavities within the solidifying casting. A beam of X-rays was passed through the test mould, on to a fluorescent screen, the resultant shadow-graph being photographed by a cine-camera, operated at normal or at high speed. The results were depicted in the Paper as groups of still pictures.

This "preliminary investigation" demonstrated that introduction of metal by horn-gate is not nearly so gentle a procedure as had been supposed, that gas-holes are formed so rapidly that especially high-speed camera technique will be necessary in order to study their formation, and that the hottest metal in the casting tends to be located at the main point of delivery of the metal stream, within the casting and not at the junction of gate

FIG. 7.—180-KG. (400 LB.) OIL-FIRED TILTING CRUCIBLE FURNACE IN OPERATION.
[Courtesy of Babcock & Wilcox, Limited]

with casting. The ingenuity and initiative of this author were fittingly recognised by the award of the British Foundry Medal for 1946, and further Papers by him or by other investigators adopting his methods may be expected to solve many problems.

Refreshingly novel ideas on methods of gating and feeding have recently been in evidence. Greater realisation of the importance of controlled directional solidification has urged the foundryman to introduce the metal at positions and in manner calculated to promote solidification from those sections farthest from the inlet towards the heated or heavier sections at the ingate. Off-feeders, generally of the whirlgate type, have come more and more into successful use. Fig. 8 demonstrates an effective application of this technique. A less orthodox method of gating and feeding is shown in Fig. 9. In this system the metal is passed from the pouring-basin or feeder-head, thorugh a long thin gate into the casting. The gate is only about $\frac{1}{4}$ in. wide, and it seems impossible for effective feeding to take place. The gate, however, has no depth and the sand "lips" are strongly heated by passage of the metal into the moulds. The additional advantage of the system, that of delivering clean metal into the mould, is obvious. It should be noted that in each of these instances the metal is passed through the feeder head before entering the mould. Two further developments in feeding technique are noteworthy: the use of an exothermic moulding compound to line feeder-heads and so delay cooling of the feed metal, and the heating of the feed-metal by electrical induction in a patented technique for the production of centrifugal castings.[22] Greater application of both methods in the future is probable.

Mechanical Aids

A feature of the period has been the increase in the application of mechanical handling, and in 1944 an Institute Committee reviewed mechanical methods used for all foundry purposes, from delivery of raw materials to despatch of finished castings.[23] Application of machine moulding expanded greatly in the period under review, particularly in the war years, when specialised plants were designed and built for supply of munitions. Since 1945, many such foundries have been converted, with success, to the production of general engineering castings in grey iron. Continued progress has been made in moulding-machine design, not so much in the invention of new types as in the improvement of existing ones. The most recent development is the completely automatic machine.

There has, however, been growing appreciation of the fact that complete mechanisation is rarely justified and that the majority of foundries can best be served

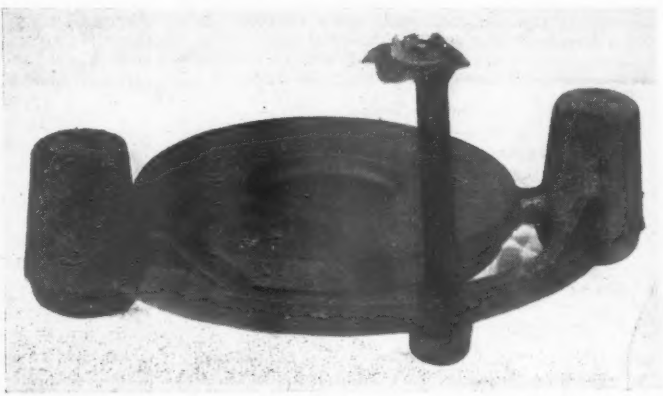


FIG. 8.—APPLICATION OF THE "OFF-FEEDER" OF WHIRLGATE TYPE.
[Courtesy of Lloyds (Burton), Limited]

by re-arrangement of lay-out where necessary and provision of mechanical aids for sand-preparation and distribution, box-handling and knock-out. A Paper by Wood[24] has described an inexpensive and efficient moulding unit for mass production in a jobbing foundry. In this unit, which employs two moulding machines, the moulds are conveyed to the pouring point, to the knock-out and back to the machines by gravity conveyor. A small aerator is included for sand-preparation.

Moulding and Core Sands

Though British foundries are normally well supplied with natural moulding sands, many of these are inadequate in strength and permeability, and, in some instances, transport costs are high. For these reasons the use of synthetic sand has increased, particularly in the mechanised foundries. Most usually, however, a suitable natural moulding sand, mixed with a selected silica sand, comprises the base. In the war years bentonite clays were scarce and all available supplies were conserved for steelfoundries. This encouraged the development of substitute materials and several British proprietary bonding clays are now used successfully.

A Paper of exceptional interest, by Sheehan,[25] demonstrated, by mathematical and by experimental methods, the influence of grain-size-distribution on permeability, green strength, expansion characteristics and surface-smoothness of core sands. The main conclusions were:—

(1) Sands with rounded grains of uniform size give maximum permeability but have poor green strength, tending to sag in the unbaked condition. Such sands, moreover, expand markedly when strongly heated, giving rise to cracks in the core and fins on the castings. (2) Sands of large uniform grain-size require least binder. (3) Sands of small, uniform grain-size produce the smoothest surfaces. (4) When the mean diameters of the constituent grains are in the ratio of 5:2 or less, the smaller particles are able to "fit into" the spaces between the larger particles. Void space is therefore reduced, and permeability is lowered. In such sands, however, green strength is relatively high. This Paper, an excellent example of the application of scientific principles in the foundry, provided a sound basis for successful practice and explained many of the earlier observations of groping foundrymen.

Core-bonding Agents

The outbreak of war brought about an acute shortage of the materials normally used as core-binders and this shortage has persisted. Many alternative materials have been developed with considerable success, the aim being to replace, wherever practicable, imported commodities by British materials or by-products of extraction or refining processes. The use of potato starch to replace wheat and maize products, and of fish oils, resin, pitch and mineral oils to replace linseed oil, are typical examples. Valuable practical guidance under this heading was given by Tipper.[26] Recently, successful use of synthetic resins has been reported. It is doubtful, however, if these, even when produced on a large scale and at correspondingly lower cost, can compete successfully with seed oils at normal prices.

Production of Cores

Core-blowing machines are now in operation in most modern foundries. Many troubles formerly associated with core-blowing have been overcome by improvements in design and by clearer understanding of the principles of operation. A really fine service under this latter heading was performed by Blakeborough,[27] who photographed, by high speed camera, the flow of blown sand in translucent core boxes silhouetted against powerful lights. The subsequent slow-motion film showed clearly the flow of the sand under varied conditions. It was demonstrated that air-borne sand behaves like a viscous liquid, that the sand-stream should not be deflected through an angle greater than 90 deg., that air-pressure and volume should be adequate and that green strength should be as low as practicable. The most important point demonstrated, however, was that for best results the air must be given adequate vents to pass out of the core-box. These should be positioned near the point of entry and face away from the direction of the air-flow.

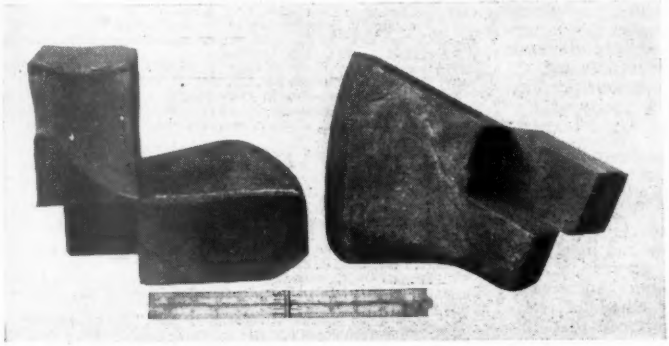


FIG. 9.—APPLICATION OF THIN-GATE OR BLOCK FEEDER SYSTEM.
[Courtesy of J. & E. Hall, Limited]

Die-casting

Foundrymen have always been fascinated by the possibility of using permanent moulds for production of grey-iron castings in quantity. Many difficulties have beset the pioneer, but this decade has seen the process fully applied in this country and an outstanding Paper has described the successful development and application of the Eaton-Erb process at the foundry of Qualcast, Limited,[28] where nine

Progress in British Ironfounding

machines, each mounting twelve moulds, are in operation. The process is continuous and automatic and the arrangements for maintaining constant temperature in the moulds for coating the moulds with a thin layer of refractory material, for deposition of carbon, for pouring and for subsequent annealing of the castings are highly efficient and, in many instances, ingenious. Other designs of permanent-mould machines are in course of development in Britain at the present time and the process undoubtedly has a great future for quantity production of castings of moderate size.

Heat-treatment

Full annealing is rarely applied to grey-iron castings other than those produced in permanent moulds. Hardening treatments, however, have come into greater use. Oil- and air-quenching, preferably followed by tempering in the range 350 to 500 deg. C., is commonly applied to castings in nickel, nickel-molybdenum and nickel-chromium irons, which are required to be extensively machined and then fully-hardened. Flame-hardening methods have also come into successful use on a production scale. Such items as machine-tool beds are regularly treated by traversing a flame along the machined "ways," followed by a suitable quench. The hardened surface is finished by grinding. For this purpose a 1½ per cent. nickel cast iron has been standardised by the largest firm of machine-tool makers in the country. Induction hardening is also practised, but its high initial cost is likely to limit its application to specialised items produced in great quantity. The subject of stress-relief has been given particular attention. The report of Institute's Sub-Committee T.S. 17[29] and a paper by Russell[30] gave the following main guidance. For complete relief of internal stress, treatment at 600 deg. C. is required. In practice, however, full relief is rarely necessary and since treatment at temperatures in excess of 550 deg. C. usually causes reduction in mechanical properties, particularly in the case of the lower-strength irons, the recommended procedure for prevention of distortion or cracking in service is to heat slowly to 450 deg. C., hold for a period at least equal to one hour per inch of thickness, and then cool slowly.

Welding

Improvements have been made in the welding of cast iron, particularly in the application of arc-welding, using nickel or nickel-copper electrodes to give sound, machinable welds. The feeling in British foundry and engineering circles, that welding of cast iron, when properly carried out, should be recognised as a satisfactory method of repair is finding expression, and Sub-Committee T.S.23 of the Institute has recently been formed to study and report on methods of reclamation of grey iron castings. It is hoped that this work will lead to the adoption of a standard code of procedure covering repair of iron castings.

(*To be continued.*)

REFERENCES.

1 "An Impact Test for Cast Iron in Great Britain," by Everest, A. B., *Fonderie*, 1947, No. 24, 947-949.

2 "A New Method of Investigating the Behaviour of Charge Material in an Iron-Foundry Cupola and Some Results Obtained," by Rambush, N. E., and Taylor, G. B., *Proc. Inst. Brit. Foundrymen*, 1944-45, XXXVIII, A118-A129; disc., A129-A135.

3 "Improvements in Cupola Furnaces," by Longden, E., Brit. Patent 526,443; Mar. 16, 1939.

4 "Hot-Blast Cupola Design," by Longden, E., *Proc. Inst. Brit. Foundrymen*, 1945-46, XXXIX, A148-A164; disc., A176-A184.

5 Contribution to Discussion on Paper, quoted under 4 by Hobson, H. D., *ibid.*, see A183.

6 "Improvement in and Relating to Foundry Cupolas and Like Furnaces," by Ashmore, Benson, Pease & Company, Limited; Rambush, N. E., and Atkinson, W., Brit. Patent 589,101; Feb. 23, 1945.

7 "Experiences with Balanced Air Feed in the Cupola," by Taft, T. H., and Hallett, H. A., *Proc. Inst. Brit. Foundrymen*, 1945-46 XXXIX, A165-A175; disc., A176-A184.

8 "Improvements in Cupola Type Furnaces," by Ford Motor Company, Limited; Renshaw, E. S., and Sargood, S. J., Brit. Patent 579,617, June 6, 1944.

9 "Improvements in and Relating to Cupola Furnaces," by Ford Motor Company, Limited; Renshaw, E. S., and Hartnett, J. V., Brit. Patent 552,637, Mar. 23, 1942.

10 "Basic Cupola Process for Desulphurisation," by Renshaw, E. S. FOUNDRY TRADE JOURNAL, 1943, LXX, 149-153.

11 "First Report on the Basic Cupola by the Melting Furnaces Sub-Committee," *Proc. Inst. Brit. Foundrymen*, 1943-44, XXXVII, A133-A142; disc., A142-A146.

12 "Second Report on the Basic Cupola," by Sub-Committee T.S. 10 of the Technical Council, Inst. Brit. Foundrymen, *Proc. Inst. Brit. Foundrymen*, 1945-46, XXXIX, A195-A198.

13 "Desulphurisation and Dephosphorisation of Molten Cupola Iron and Pig-Iron in Basic-Lined Ladles," by Sub-Committee T.S.10 of the Technical Council, Inst. Brit. Foundrymen, *Proc. Inst. Brit. Foundrymen*, 1946-47, XL, B14-B21; disc., B21-B40.

14 "Melting Practice in a Large Engineering Iron Foundry," by Braidwood, W. W., *Proc. Inst. Brit. Foundrymen*, 1938-39, XXXII, 405-418; disc., 418-420.

15 "A Novel Development in Melting Practice," The Walbro Cupola Attachment, by Faulkner, V. C., FOUNDRY TRADE JOURNAL, 1938, LVIII, 235-236.

16 "The Syphon Brick Method of Cupola Tapping," by Dunning, E. B., *Proc. Inst. Brit. Foundrymen*, 1943-44, XXXVII, B42-B45.

17 "The Constant-Charge System of Cupola Operation," by Braidwood, W. W., FOUNDRY TRADE JOURNAL, 1948, LXXXIV, 435-439; 465-468.

18 "Electric Furnaces in the Manufacture of High-Duty Cast Iron," by Twigger, T. H., *Proc. Inst. Brit. Foundrymen*, 1942-43, XXXVI, 192-198; disc., 198-199.

19 "Control Tests for Grey Cast Iron," by Sub-Committee T.S. 6 of Technical Council, Inst. Brit. Foundrymen, *Proc. Inst. Brit. Foundrymen*, 1945-46, XXXIX, A28-A51.

20 "Some Factors Affecting the Formation of Shrinkage Defects in Cast Iron," by Timmins, A. A., *Jnl. Research and Development*, Brit. Cast Iron Research Association, 1947, II, 19-36; 47-62.

21 "Preliminary Investigation of Metal Pouring by Cine Radiography," by Fry, S. L., *Proc. Inst. Brit. Foundrymen*, 1944-45, XXXVIII, A45-A53; disc., A53-A54.

22 "Improvements in the Casting of Metals," by Ford Motor Company, Limited, Brit. Patent 578,123, May 23, 1942.

23 "Mechanical Handling in Foundries," by Mechanical Development Sub-Committee of the Technical Committee, Inst. Brit. Foundrymen, *Proc. Inst. Brit. Foundrymen*, 1943-44, XXXVII, A20-A33; disc., A33-A39.

24 "A Small Moulding Unit," by Wood, A. W., *Proc. Inst. Brit. Foundrymen*, 1943-44, XXXVII, B1-B4.

25 "Core-Shop Control," by Sheehan, J. J., *Proc. Inst. Brit. Foundrymen*, 1938-39, XXXII, 43-58; disc., 59-65.

26 "Practical Economies in the Use of Corebinders," by Tipper, A., *Proc. Inst. Brit. Foundrymen*, 1942-43, XXXVI, 239-247; disc., 247-249.

27 "Sandstorm Secrets," by Blakeborough, J. B., FOUNDRY TRADE JOURNAL, 1946, LXXX, 379.

28 "Ferrous Die Castings," by Pollard, C. D., Redshaw, H. A., and Payne, C. A., *Proc. Inst. Brit. Foundrymen*, 1946-47, XL, A30-A43; disc., A43-A46.

29 "Stress-Relief Treatment of Iron Castings," by Sub-Committee T.S. 17 of the Technical Council, Inst. Brit. Foundrymen, *Proc. Inst. Brit. Foundrymen*, 1946-47, XL, B41-B45.

30 "Heat-Treatment of Grey Cast Iron for Relief of Internal Stresses," by Russell, P. A., *Proc. Inst. Brit. Foundrymen*, 1945-46, XXXIX, A185-A190; disc., A190-A191.

Annual Meeting of the Scottish Branch

Presentation to Mr. John Bell

Preceding the Annual Meeting, on March 12, at the Royal Technical College, Glasgow, of the Scottish Branch of the Institute of British Foundrymen, there was held a full meeting of the Branch Council, with Mr. W. Y. Buchanan, President of the Branch, in the chair. The President of the Institute, Mr. R. B. Templeton, M.I.Mech.E., and the General Secretary, Mr. Tom Makemson, M.B.E., were also present, and were welcomed to the meeting by the Branch President. The only item on the agenda was a presentation to the Honorary Branch Secretary, in recognition of the completion of twenty-five years' service in that office.

In his opening remarks, Mr. Buchanan dealt with the work Mr. Bell had done for the Branch, and also for individual members of the Branch, and pointed out that much of the help he had given was not always in the course of Institute duties. Very often it was a case of giving personal guidance on problems that more often than not, come to everyone some time in life. He also mentioned that it was through Mr. Bell that he, himself, had entered the Institute. He owed a great deal of his success to Mr. Bell's encouragement and service, and he felt sure that he would not have had the honour of becoming Branch President if it had not been for the guidance given to him by the Branch Secretary. In presenting a fitted Dressing Case to Mr. Bell, he identified it not as a presentation from the Branch, but rather as a gift from friends associated with him in the work of the Council.

Mr. Bell's Reply

In accepting the gift, Mr. Bell said that in serving the Branch and the Institute during the past twenty-five years, he had found a great deal of pleasure. He had never found the work tiresome or irksome. On the other hand, he had enjoyed every minute, and he particularly stressed that he felt he had never given to the Branch and the Institute anything like so much as the Branch and the Institute had given him. It has brought him many warm and lasting friendships. So long as the Institute required his services, and he had the good fortune to enjoy good health, he would always be willing to continue.

At the conclusion of Mr. Bell's remarks, Mr. Sharpe, a past-president of the Institute and of the Branch, pointed out that the growth of the membership in the Scottish Branch, the quality of the Papers presented, and the high standard of all-round efficiency were largely due to the efforts of the Branch Secretary. He added that he was delighted to be present at such a meeting, and was glad to have this opportunity to express his great appreciation of the work Mr. Bell had done during the past twenty-five years. This part of the afternoon's programme concluded by Mr. Bell receiving heartiest congratulations from all present.

Annual Meeting

The annual general meeting of the Branch was then held, Mr. W. Y. Buchanan presiding. After the minutes of the last Annual General Meeting had been presented and signed, Mr. John Bell, the Honorary Secretary, presented his annual report, in the course of which he said:—

Membership

The membership has increased by 31 and now totals 507. However, explanations are called for, especially with regard to the grades of member and associate member, because in October, 1948, the new charter and bye-laws came into operation, effecting many changes. Hitherto, the Scottish Branch dealt with subscribing firms and their representatives as one unit. Now the representatives have been added to the grade to which they belong. There are only nineteen such representatives due to the fact that three subscribing firms have not yet nominated any of their staffs to act as such. This, of course, has the effect of adding nineteen persons to the list of members in addition to those who were admitted without any subscribing-firm connection.

Whereas during the last session 100 new members were admitted, during this session there were only 72. Of the 27 members included in this total, two were representatives of the new subscribing firms while 17 were previously in the register but were not numbered in the membership. They were each grouped with their firms as one unit. The number of Associate Members is the lowest admitted for some time. This is partly due to the operation of the new bye-laws under which, unless with special qualifications, an applicant for Associate Membership must be not less than 27 years of age. Under the old bye-laws he could have been admitted after reaching his 21st birthday. In time, this will modify the characteristics of the membership. There will probably be fewer young members and associate members and more associates but, as a compensating factor, the honour of belonging to the higher grades will be greater because the qualifications for admission will be higher. It is hoped the new conditions of membership will substantially raise the status of the Institute.

There was a big reduction in the number admitted to the associate grade but the number admitted during the previous session was quite unusual and may not be repeated. However, in view of the circumstances stated above, for a year or two the number of associates may gradually increase, while the numbers of members and associate members remains steady or even diminishes.

The losses during the year were greatly different from the previous year. Then, there were several resignations due to the previous increase in subscriptions. This year, losses due to this cause were to be found in the number who had been struck off for non-payment of their subscriptions. The possibility of this was suggested in the last Report. The number transferred was substantially less than previously which indicates that conditions were becoming more stabilised again.

Annual Meeting of the Scottish Branch

There was only one loss by death. That was by the loss of Mr. Thomas Tyrie—better known to his friends as Tommy—a popular and friendly member of the Branch. He was an active and enthusiastic member, had served a term as President of the Falkirk Section, and was later called upon to take up the responsibilities of Branch President. In this position he worked strenuously.

Programme of Meetings Held

Compared with last session, attendances at the Branch meetings showed a little improvement. For last session the figures were: Highest, 131; lowest, 76; and the average, 100. Once again the Branch held a joint meeting with the Dundee Institute of Engineers. Following precedent, the speaker on this occasion was our Branch President, Mr. Wm. Y. Buchanan, who was accompanied by a number of members from the Glasgow district. There was a full attendance of members in Angus. Mr. John F. Webster, now Dean of Guild of Arbroath, discharged the duties of guest chairman. The following morning the party, in response to a kind invitation from Douglas Fraser & Company, Limited, visited their works at Arbroath where the whole forenoon was spent touring the various departments, including the foundry. The party was afterwards entertained to lunch at which Mr. Buchanan expressed the thanks of those present to Mr. Norman Fraser and his co-directors. As in former years, the Members were greatly indebted to Mr. David Whyte, Hon. Secretary of the Dundee Institute, for the invitation to join with his institute and for all the excellent arrangements made.

Falkirk Section

The meetings of the Falkirk Section were up to their usual high standard. Attendances and discussions alike justified the effort made by the local council, ably led by the President, Mr John N. Reid, while Mr. T. R. Goodwin, Hon. Secretary, kept an experienced and guiding hand on the wheel. The Denny discussion group, in which most of the Denny members took an active part, had also had a good session and there was no doubt that the work being done in Denny was helping greatly in the work of the Branch.

The competition, based on "Making the Foundry More Attractive," was won by Mr. J. G. Nesbit (Glasgow), with Mr. James Meek (Kirkintilloch) and Mr. Walter Graham (Wishaw), bracketed second.

The Papers all contained many useful suggestions and Mr. R O. Patterson undertook the work of preparing a Report combining the various entries and presenting it to a meeting.

The work of the Scottish Engineering Students' Association still goes on, with Mr. J. B. Morton still serving on its council as a representative of the Foundrymen. Members of the "Students" must be less than 30 years of age and any members who were eligible and wished to join should notify the Secretary as soon as possible. There is no subscription payable.

Education

In connection with education, reference should be made to the new School of Engineering opened by the Lanarkshire County Council at Burnbank. Included in the school is a small foundry, the students in it being under the instruction of Mr. Cyril B. Fearnside, who is a Branch member. With the Principal of the School, Mr. R. H. Garner, B.Sc.(Eng.), in full sympathy with the work, the foundry and pattern-shop apprentices in Lanarkshire had every encouragement to learn "something more" about the technique of their work. The work at the Stow College of Engineering in Glasgow also continues successfully. Here Dr. Cormack and seven teachers in the foundry and patternmaking section (all Branch members) help to advance the interest of the industry and the Institute. It may also be mentioned in this connection that the President, Mr. W. Y. Buchanan, has been teacher of the Foundry class in the Royal Technical College for many years, and many of the young men now joining the Institute have been students under him.

Works' Visits

During the session two works' visits were held. The first, by invitation of the directors of Federated Foundries, Limited, was paid to the Saracen Foundry, and the second, by invitation of the directors of Argus Foundry, Limited, to their works at Thornliebank. Both were very well attended.

The only social event of the session was the Annual Dinner in March, 1948. It was a very successful gathering.

At this stage Mr. Bell broke through a somewhat rigid, self-imposed discipline to put a personal note. This was the 26th annual report which he had had the honour of submitting. It represented something over 25 years of service. During the passage of these years he has been conscious of many shortcomings and, for the blind eye with which presidents, councillors, and members, alike, have looked upon them, he returned grateful thanks.

The secretary's report was then adopted and the financial report, which showed a subscription total of £959, was presented and also adopted.

The following officers for the 1949-1950 session were elected:—As *President*, Mr. R. S M. Jeffrey, B.Sc., F.R.I.C.; as *Vice-Presidents*, Mr. James G Arnott and Mr. R. R. Taylor; as *Members of Council*, Mr. Daniel Brown, Mr. William Bulloch and Mr. Joseph Gorman; as *Representatives to General Council*, Mr. John Cameron, Jr., Mr. Alex. Marshall, Mr. Tom Shanks and Mr. R. R. Taylor; as *Representative to Technical Committee*, Mr James McPheat; and as *Hon. Secretary*, Mr. John Bell.

After adoption of the reports and election of the office-bearers, Mr. Templeton congratulated the Branch on another highly successful session. Mr. Makemson emphasised the importance of the new charter and bye-laws, in the preparation of which the Scottish Branch Secretary had taken quite a prominent part. Both speakers referred to the work of Mr. Bell, and expressed the widespread hope that he would long be spared to continue the work which he had undertaken so efficiently for so long a period.

A Paper entitled "Work in a Jobbing Foundry" was thereafter presented to the Branch by Mr. Hal, London, and Mr. J. F. Dowell, Leven.

(*Continued on page 266.*)

Institute of British Foundrymen

Annual Conference, Cheltenham Spa — *June* 14 *to* 17, 1949

The 46th Annual Conference of the Institute is being arranged under the auspices of the Bristol and West of England Branch and will be held at Cheltenham Spa from June 14 to 17, 1949. Excellent arrangements for the Conference meetings and social functions have been provided by the courtesy of the Corporation of Cheltenham, and, although Cheltenham is not an industrial centre, it has been found possible to arrange a number of visits to very important works, including foundries of first-class interest, by courtesy of the various firms. Additionally, Cheltenham and the Cotswolds form an ideal touring ground and full advantage has been taken of this in making the plans for the ladies' excursions.

The following programme, subject to final revision, has been arranged:—

TUESDAY, JUNE 14

Council and Committee meetings will be held during the afternoon. These are open to Council and Committee members only, who will receive further particulars later.

8.00 p.m. to 11.00 p.m.: Reception at the Old Town Hall, Regent Street, Cheltenham Spa (near Promenade and present Town Hall), by His Worship the Mayor of Cheltenham and the Mayoress. Concert and entertainment (members and ladies). Coaches will collect members and ladies at their hotels from 7.30 p.m. and will return at 11.00 p.m.

WEDNESDAY, JUNE 15

9.15 a.m.: Welcome by His Worship the Mayor of Cheltenham in the Pillar Room, at the Town Hall, Oriel Road, Cheltenham Spa, followed by the Annual General Meeting in the Pillar Room (members only). After the presentation of awards, Mr. N. P. Newman, J.P., will deliver his Presidential Address. The session will conclude with the Edward Williams Lecture on "Metal Founding through the Ages," to be delivered by Prof. Hugh O'Neill, D.Sc., M.Met., F.I.M., University College, Swansea. At 1.00 p.m. luncheon will be served in the Large Hall of the Town Hall, Cheltenham Spa, at the invitation of the Bristol and West of England Branch (members and ladies). At 2.30 p.m. to 5.00 p.m. there will be Technical Sessions in the Pillar Room and the Drawing Room at the Town Hall, Cheltenham Spa. At 6.30 p.m. coaches will be available to take members and ladies from their hotels to the Town Hall for the reception and annual dinner. The reception will be by the President and Mrs. Newman, prior to the annual dinner and dance, in the Large Hall of the Town Hall. This is to be followed by old-time dancing to Mr. Arthur Cole's Orchestra and a cabaret. Evening dress and decorations will be worn.

THURSDAY, JUNE 16

At 9.30 a.m. and 2.15 p.m. there are to be Technical Sessions in the Drawing Room and the Pillar Room of the Town Hall, Oriel Road, Cheltenham Spa, luncheon is to be served at 1 p.m., in the Large Hall of the Town Hall, for members and ladies who are not taking part in the excursion to the Cotswolds. At 4.45, coaches will leave Imperial Gardens, Cheltenham Spa, for the Shakespeare Memorial Theatre, Stratford-on-Avon (members and ladies), where at 6.30 dinner will be served at the Riverside Hotel, Stratford-on-Avon, after which members and ladies will attend a performance at the theatre.

FRIDAY, JUNE 17

Members may participate in one only of the following visits or groups of visits:—Motor coaches depart from the Town Hall, Oriel Road, Cheltenham Spa, for the following visits: (1) 9.15 a.m., (*a*) Magnal Products, Limited, Warmley, near Bristol (light alloy castings) (morning); and (*b*) Newman Industries, Limited, Yate, near Bristol (electrical equipment, pumps, steelfoundries) (afternoon). Luncheon on arrival at the works of Newman Industries, Limited, is to be kindly provided by the company, who will also entertain the party to tea. Coaches arrive at the Promenade, Imperial Gardens, Cheltenham, on return at about 6.00 to 6.15 p.m. (2) 9.30 a.m. (*a*) Newman, Hender & Company, Limited, Woodchester (valves, steam and water fittings, iron and brass foundries) (morning); and (*b*) R. A. Lister & Company, Limited, Dursley, Glos (agricultural, electrical and general engineers; repetition ironfoundry) (afternoon). Lunch by kind invitation of Newman, Hender & Company, Limited. Tea by kind invitation of R. A. Lister & Company, Limited. Arrive Imperial Gardens, Cheltenham, on return, 6.00-6.15 p.m. (3) 9.45 a.m., Douglas (Kingswood), Limited, Kingswood, Bristol (iron and light alloy foundries, die castings). Luncheon at the Grand Hotel, Bristol, 12.00 noon, by invitation of Bristol and West of England Branch. Visit to works, 1.30 p.m. Tea by kind invitation of the company. Depart 4.30 p.m., arriving Promenade, near Imperial Gardens, Cheltenham, 6.15-6.30 p.m. (4) 9.45 a.m., Bristol Aeroplane Company, Limited, Bristol (aluminium and magnesium foundry). Luncheon at Grand Hotel, Bristol, 12 noon, by invitation of Bristol and West of England Branch. Visit to works, 1.30 p.m. Tea by kind invitation of the company. Depart 4.00 p.m., arriving Promenade, near Imperial Gardens, Cheltenham, at 6.00-6.30 p.m. (5) 9.45 a.m., Stothert & Pitt, Limited, Bath (makers of cranes, contractors' machinery, ship's deck machinery, pumps; large ironfoundry). Luncheon at 12 noon at Fortts, Milsom Street, Bath, by invitation of Bristol and West of England Branch. Arrive works, 1.15 p.m. Tea by kind invitation of the company. Depart Bath, 4.00 p.m., arriving Promenade, near Imperial Gardens, Cheltenham, at approximately 6.00 p.m. (6) 9.45 a.m., Westinghouse Brake & Signal Company, Limited, Chippenham (railway, colliery and electrical engineers; nonferrous ironfoundries). Luncheon at Angel Hotel at 12 noon by invitation of Bristol and West of England Branch. Arrive works, 1.15 p.m. Tea by kind invitation of the company. Depart 4.00 p.m., arriving

I.B.F. Annual Conference

at the Promenade, near Imperial Gardens, Cheltenham, at 6.00 p.m. 7.30 for 8.00 p.m., Supper Dance and Cabaret in the Large Hall of the Town Hall, Cheltenham Spa (members and ladies) (evening dress optional). Coaches will be available for taking members and ladies from their hotels from 7.00 p.m. onwards and will return at 1.00 a.m.

LADIES' PROGRAMME

TUESDAY, JUNE 14

8.00 p.m.: Reception by His Worship the Mayor of Cheltenham and the Mayoress, at the Old Town Hall, Regent Street, Cheltenham Spa (near Promenade and present Town Hall).

WEDNESDAY, JUNE 15

10.30 a.m.: Coffee at the Cadena Corner House, Promenade, Cheltenham Spa, by kind invitation of Mrs. Newman. 1.00 p.m.: Luncheon in the Large Hall of the Town Hall, Cheltenham Spa (invitation of the Bristol and West of England Branch) (members and ladies). Afternoon free. 7.00 p.m.: Reception by the President and Mrs. Newman prior to the Annual Dinner and Dance at the Town Hall, Cheltenham Spa.

THURSDAY, JUNE 16

10.00 a.m.: Depart Town Hall, Oriel Road, Cheltenham, for motor-coach tour in the Southern Cotswolds. Proceed *via* Burford, Bibury to Cirencester. Luncheon at King's Head Hotel, Cirencester, at 12.45 p.m. Continue *via* Malmesbury, Tetbury, Avening, Stroud, arriving Cheltenham about 3.30 p.m. 4.45 p.m.: Coaches depart Town Hall, Oriel Road, Cheltenham, for Shakespeare Memorial Theatre, Stratford-on-Avon (members and ladies). (For details see Members' Programme.)

FRIDAY, JUNE 17

Ladies may participate in one only of the following tours:—

9.15 a.m. (*a*), Excursion to Bath. Depart Town Hall, Oriel Road, Cheltenham. Proceed *via* Castle Coombe, Lacock to Bath. 1.00 p.m., lunch at Fortts, Milsom Street, Bath. After lunch Mr. J. E. Boddington, M.A. Spa Director, will take the party on a short tour of the Roman Baths and the Pump Room. 4.00 p.m., tea at Fortts, Milsom Street, Bath. 4.30 p.m., depart Bath, arriving Cheltenham Spa about 6.30 p.m.

9.30 a.m. (*b*): Tour of Bristol. 11.00 a.m., arrive Bristol and drive over Clifton Downs. 12 noon, lunch at the Berkeley, 26, Berkeley Square, Clifton. 1.15 p.m., depart for Clifton Zoo. 3.15 p.m., tea at Caroline's Glen. Depart on return journey about 4.00 p.m., arriving Cheltenham Spa about 6.00 p.m.

7.30 for 8.00 p.m.: Supper Dance and Cabaret in the Large Hall of the Town Hall, Cheltenham Spa.

PROGRAMME OF PAPERS

Wednesday, June 15.—2.30 p.m. to 5.00 p.m.: Two simultaneous sessions. Session A (in the Pillar Room, Town Hall, Cheltenham Spa):—No. 930, "Stress Relief Heat-treatment of Alloy Cast Iron," by M. M. Hallett, M.Sc., F.I.M., and P. D. Wing, Assoc.Met. No. 931, "The Influence of Heating Rate in Malleable-iron Annealing," by S. W. Palmer, A.R.I.C. (British Cast Iron Research Association). No. 932, "The Influence of Stripping Temperature on the Properties of Pearlitic Grey Cast Iron"—report of Sub-committee T.S.18 of the Technical Council.

Session B (in the Drawing Room, Town Hall, Cheltenham Spa): No. 933, "Factors Controlling the Incidence of Hot-tearing in Aluminium Casting Alloys," by D. C. G. Lees, M.A., A.I.M. (Aluminium Development Association). No. 934, "Examples of Aluminium Alloy Foundry Practice," by J. Caven and H. W. Keeble, A.I.M. (Aluminium Development Association). No. 935, "Notable Aluminium Alloy Castings," by A. R. Martin (Aluminium Development Association).

Thursday, June 16.—9.30 a.m. to 12.45 p.m.: Two simultaneous sessions:—Session C (in the Drawing Room, Town Hall, Cheltenham Spa): No. 936, Experiences with Ethyl Silicate in the Foundry," by D. F. B. Tedds. No. 937, "Problems in Bronze Foundry Practice," by Dr. A. J. Smith (Exchange Paper from American Foundrymen's Society). No. 938, "Mechanical Properties of Copper-base Alloy Castings" (a communication from the Technical Committee of the Association of Bronze and Brass Founders).

Session D (in the Pillar Room, Town Hall, Cheltenham Spa):—No. 939, Report of the Technical Committee of Lake & Elliot, Limited (presented on behalf of the Committee by C. H. Kain). No. 940, "The Effect of Grain Shape on the Behaviour of Synthetic Core and Moulding Sands," by W. J. Rees, O.B.E., D.Sc.Tech., F.R.I.C., and W. A. Davies, M.Sc., Ph.D., F.G.S. No. 941, "Notes on the Hot Extraction Method as Applied to Cast Iron," by J. E. Hurst, D.Met., F.I.M., and R. V. Riley, Ph.D., B.Sc., A.I.M. (Research Department of the Staveley Iron & Chemical Company, Limited).

2.15 p.m. to 3.45 p.m.: Session E (in the Pillar Room, Town Hall, Cheltenham Spa):—No. 942, "The Production of Metallurgical Coke," by M. D. Edington, Coke Oven Managers' Association). No. 943, "Cupola Charge Materials"—report and recommendations of Sub-committee T.S.27 of the Technical Council.

Session F (in the Drawing Room, Town Hall, Cheltenham Spa):—No. 944, "The System of Costing in a South African Foundry," by C. I. Rhind (South African Branch). No. 945, "Organisation for the Training of Apprentices in French Foundries," by Daniel Waeles (Exchange Paper from *L'Association Technique de Fonderie*).

Additional Paper.—No. 946, "The Metallurgical Examination of a Cannon Ball Found after the Battle of Lichfield," by J. E. Hurst, D.Met., F.I.M., and R. V. Riley, Ph.D., B.Sc., A.I.M. The session to which this Paper is allocated will be announced later.

THE SCOTTISH CENTRE of the Institution of Electrical Engineers intends to hold a special general meeting of the Centre in the Heriot-Watt College, Edinburgh, on March 30, 1949, at 7 p.m., to consider the formation of a South-East Scotland Sub-Centre, serving Edinburgh and the surrounding district.

"Cast Down"

By "Tramp"

Occasionally, patterns are received in the foundry with the words "cast down" painted on one face. Often, to cast the job in the position indicated necessitates a rather more difficult moulding operation than if it could be cast in the reverse position and the moulder sometimes tends to disregard the instructions and make it in the easiest way. This is a poor policy, for invariably these castings are returned as unsuitable.

A particular case concerned a portion of a bread-making machine. One face of this casting, which was to work in direct contact with the dough, was required to be spotless, as the casting was not to be machined or faced in any way. This information was marked on the drawing and the patternmaker knew that the best metal is to be found on the bottom face of a casting, as any dross in the mould, being lighter than the molten metal, floats on top, thus creating "dirty" patches. He consequently marked the face which was required to be sound "cast down." On receiving the pattern, the moulder, who had not seen the drawing, and thus did not know of the conditions under which the casting was to work, took a chance by making the casting in the easiest way. This resulted in the batch being scrapped due to the inclusions in the important face. Although only slight, the defects were sufficient to render the castings useless for the purpose intended. The words "cast down" should thus be treated seriously by the moulder if scrapped castings are to be avoided, even if moulding costs are a little higher.

New Platform Truck

A new manually-operated platform lift truck, of more than usual versatility, known as the "Hydra-truck," was last week demonstrated by the makers, Power Jacks, Limited, of Acton, London, to representatives of the technical Press. As the name suggests, it works on the hydraulic-jack principle through a system of levers. In one minute it will pump a load of 10 cwt. from 7 in. to 4 ft. 8 in. above ground level. It is particularly suited for use with stillages and the demonstration showed its use with cast-aluminium platforms about 4 ft. square (with legs integrally cast) made by a well-known light-alloy foundry. Other potential uses include stacking, the lifting of bales and drums (in this instance a platform tilt can be arranged for self-discharge), and the loading of vehicles. In the foundry it could also be used for lifting and conveyance of moulds to stoving bogies or the lifting of castings to bench or machine height for treatment, all without the use of crane or track. Lowering at maximum speed takes 20 secs., but can be so gently controlled by a finger-tip release valve that, were it not for a slight radius of movement, the mechanism could be used for closing moulds. The truck is compact and mobile on wheels at the front and castors at the rear. During lifting or standing, the front wheels are braked in similar manner to a motor-car hand-brake. The price of £85 should place it within reach of a wide section of buyers.

Publication Received

The Training Centre. Published by the Stanton Ironworks Company, Limited, near Nottingham.

A note which accompanied this brochure carried the information that a hostel was available for housing boys from the more remote works of the Stanton organisation. For this purpose a large house has been bought and suitably arranged. One of the main activities of this centre is training of foundry apprentices, and the brochure discloses by excellent photographs and lucid explanation the splendid equipment available. It will be something of a revelation to many of our overseas readers to learn that no small amount of mechanisation has entered into the equipment of this training plant. For instance, the sand-preparation plant comprises a knock-out grid with a conveyor belt and magnetic separator for handling the return sand. This then passes through a rotary screen before being elevated to a storage bunker. Dust from the sand-handling plant is removed by an adequate extracting plant. Sand mixing is effected in a sand mill equipped with a batch-loader. Core sand is prepared by mixing sand (dried in a stationary type of plant) with the oil in a small mixer. Cores are dried in a brick-lined coke-fired stove. They are handled by a lift truck using stillages.

Metal can be melted either in a cupolette or an oil-fired tilting crucible furnace. The foundry floor, which covers approximately 2,000 sq. ft., is spanned by a one-ton hand moved crane with electric hoisting blocks. Finally, there is a gravity conveyor for transferring the moulding boxes to the knock-out grid. In the fettling shop there is a shot-blasting plant and a double-ended grinding machine.

For the patternshop, more stress is laid on the use of hand tools and the machinery installed is limited to a modern lathe. Apprentices learning their trade at Stanton can indeed count themselves fortunate, for, in addition to receiving a thoroughly practical and technical training, their material welfare is well ordered.

Engineers and Public Life

Speaking at the annual dinner of the Keighley Association of Engineers, on March 12, Lieut.-Col. C. W. Mustill, chairman of the Leeds branch of the Institution of Works Managers and past-president of the Yorkshire section of the Institution of Production Engineers, expressed the view that it would be a good thing if more engineers took part in municipal and national life. He considered it their duty to take part in public life, and so place at the disposal of all bodies their experience in engineering problems. which should be done without any political creed or party feeling.

ON PAGE 184 of our issue of March 3, the final equation in the article by A. Jamieson, entitled "The Mechanics of Moulding-sand Properties," should read:

$$\text{G.F.} = 144\,\frac{fx}{V}\ \text{ft.-lb. per cub. ft.}$$

We regret that part of this equation was inverted in the original version.

Correspondence

[We accept no responsibility for the statements made or the opinions expressed by our correspondents.]

BELIEVE IT OR NOT . . .

To the Editor of the FOUNDRY TRADE JOURNAL

SIR,—The Albion (Mansfield) Sand Company, whose red moulding sands have long been familiar to foundrymen, have discovered another use for their product. Unfortunately, the tonnages involved in the new application are not large. It appears that this sand has some unique property which makes it just the stuff to give that extra turn of speed to racing pigeons. Pigeon fanciers decline to state what extra m.p.h. is obtained, but if the behaviour of birds we have tried to shoot in the Mansfield locality is any criterion, then a well-bred racer should approach the supersonic or thereabouts.

Unfortunately for the verisimilitude of our story, another ingredient is necessary to transform Mansfield sand into a racing mixture: this is a pinch of salt. As most readers will already have taken this report *cum grano salis*, this additional information will cause the whole subject to be viewed with suspicion. However, there it is—believe it or not; yet one thing is certain: the writer will have a bob "each way" in the future on any pigeons owned by foundrymen using this particular sand.—Yours, etc.,

"DRAWBACK."

Annual Meeting of the Scottish Branch

(Continued from page 266.)

Branch Dinner

In the evening the Annual Dinner of the Branch was held in the Grosvenor Restaurant, Glasgow. Mr. Buchanan, who presided, was accompanied at the high table by Bailie John M. Inglis, representing the Lord Provost of Glasgow, Dr. Cormack, B.Sc., Principal of the Stow College of Engineering, as well as by Mr. Templeton, President of the Institute, Mr. Sharpe, past-president, Mr. Tom Makemson, Secretary, and others.

Mr. Sharpe, in proposing the toast of "The City and Corporation of Glasgow," suggested the building of multi-storied flats for industry within the city.

The toast of "The Institute of British Foundrymen" was given by Dr. Cormack, who referred to the difficulties surrounding the apprenticeship problem. He thought some re-arrangement of apprenticeship should be made whereby all apprentices would be trained in both branches—patternmaking as well as moulding. In a similar manner to academic studies embracing main and subsidiary subjects, said Dr. Cormack, it should be possible in the industrial sphere for an apprentice to learn a main trade and a subsidiary one.

The toast of "The Scottish Branch" was proposed by Mr. Tom Makemson, who made reference to the many activities of the Branch, and the outstanding contribution which it had made to the Institute and to the industry. Replies to the various toasts were made by Bailie John M. Inglis, Mr. Templeton and Mr. Buchanan. There was a record attendance.

Proposed New Regulations for Shot Blasting

The Minister of Labour and National Service proposes to make new Special Regulations, entitled the Blasting (Castings and Other Articles) Special Regulations, 1949, to lessen the risk of silicosis among workers employed in "blasting" (defined as the cleaning, smoothing, roughening or removing of part of the surface of any article by the use as an abrasive of a jet of sand, metal shot, or grit or other material, propelled by a blast of compressed air, or steam or by a wheel).

Various measures and precautions have been adopted in industry with a view to reducing this risk, and to some extent these are already required by law. In the light, however, of enquiries and experience it is considered that the law should be strengthened by new Regulations. The object of the proposed Regulations is, broadly speaking, two-fold.

First, it is proposed to prohibit what is commonly known as "sand-blasting," *i.e.*, the use of siliceous abrasives in "blasting" apparatus. This practice has already been largely abandoned because of the high risks involved; and it is proposed that the prohibition should apply to all factories in which "blasting" is done, with, however, a provision enabling exemptions to be granted in exceptional cases. Secondly, the proposed Regulations would prescribe more elaborate precautions than are at present legally required in connection with "blasting" incidental to the cleaning of castings.

An earlier draft of Regulations for these two purposes was published by the Ministry of Labour some time ago. Various criticisms of the earlier draft were then made by representatives of industries concerned, and these have been taken into consideration in framing the revised proposals embodied in the present draft, copies of which may be obtained from H.M. Stationery Office, York House, Kingsway, London, W.C.2, or their Edinburgh, Manchester, Cardiff, Bristol and Belfast offices, or through any bookseller. Price 1d. net.

Any objections to the draft Regulations by or on behalf of persons affected must be sent to the Minister on or before April 30, 1949. Any objections must be in writing and must state (*a*) the specific grounds of objection; and (*b*) the omissions, additions or modifications asked for. Objections may be addressed to the Secretary, Ministry of Labour and National Service, 8, St. James's Square, London, S.W.1.

WITH THE SLOGAN "Tidiness is the Foundation of Safety," a Sheffield group launched their "Good Housekeeping Week" effort on March 21, when over a quarter of a million workers in over 100 local factories were requested to undertake a thoroughgoing week's spring clean at their works. As a result, it was hoped that this effort, the first of its kind in the country, would lead to safer and better working conditions, fewer and less serious accidents, more production, more happiness at work and less cause for anxiety at home.

British Industry in 1949

Tasks Outlined in Government Survey

In its "Economic Survey for 1949,"* the Government lays down four objectives which "stand out as paramount for 1949." These call for a major effort to expand still further the sales of British goods in Canada and the United States; the expansion of production generally and particularly of coal, steel, agriculture, and textiles; the search for ways of bringing down costs, particularly of exports, and of maintaining the quality of British products; and the combat of inflation with all the weapons used in 1947 and 1948.

Sir Stafford Cripps, Chancellor of the Exchequer, announced at a Press conference held in connection with the publication of the "Survey" that the Government had a plan to give a "considerable amount of Government assistance" to exporters to help them increase their shipments to the United States and Canada. Details of the plan would be announced in Parliament when the "Economic Survey" was debated conjointly with the coming Budget.

The "Survey" outlines the progress made last year towards national recovery, describing 1948 as a year of "great and steady progress." Progress made in 1948, combined with the assistance received from the United States, averted the dollar crisis that threatened in 1947. But, great as it was, this economic advance pointed to no early and complete solution of the country's problems. The position is still dangerous in a number of critical sectors. Above all, we were still, at the end of the year, far from paying for our dollar imports from our current dollar earnings. In terms of dollars we are still not paying our way. Sustained efforts to solve the hard core of our economic difficulties are still required.

Output and Exports

Outlining prospects for 1949, the "Survey" says plans will be misconceived, and the problems facing the country misunderstood, if it is thought that output and exports can continue to expand as fast as in the last two years. The rate of increase of industrial production tended to lessen after the autumn of 1947. The period of rapid expansion in many parts of the economy is drawing to a close. The process of growth has changed. Future progress will result from technical progress, new capital equipment, improved organisation, steadier and more productive work, and not from an increased labour force and the gathering of the fruits of reconversion in earlier years. This fundamental change in the forward prospect must be borne in mind in considering every part of the plans, programmes and forecasts for 1949.

It is not yet possible to state all the programmes with precision. The aid the United Kingdom may receive under E.C.A. is still unknown, and many plans may yet need to be revised. A further caveat is necessary. All statements in this "Survey" about 1949 assume the continuance of present defence policies. So long as the working population is fully employed, its size and the average amount each worker produces will determine total production. But beyond these broad factors, and more important in the short period, are the problems of particular industries and particular supplies.

Increasing Steel Supplies

Despite the remarkable progress made in increasing steel supplies—reflected in an increase in home output from 12.7 million ingot tons of steel in 1946 to the record of 14.9 million ingot tons in 1948—continued expansion of output during the next three or four years is essential to the success of our economic and industrial policy. Long-term plans for the steel industry aim at an output of about 17½ million ingot tons in 1953-54 which, with imports, would, it is hoped, yield, a total supply of at least 18 million ingot tons. Further progress towards this objective is expected in 1949. In the shorter term, the indications are that the demand for steel both for export and for home investment will remain intense in 1949, and that excess of demand over supply will continue to impose limitations on various parts of our industrial effort. The largest possible home output and the greatest practicable imports will therefore again be needed in 1949.

Because of the new blast and steel furnaces that will be coming into operation this year, it might be thought that a further large increase in steel output in 1949 presents little difficulty. This, however, is not so. Other factors may limit output, such as scarcity of raw materials, hard coke of adequately high quality, rich imported iron ore and scrap. Steps already taken will, it is hoped, secure adequate supplies of coke; but the margin is narrow. Expansion of supplies of hard coke remains a most important task. Imported ore supplies are not yet fully assured, and only a part of the deficiency can be made good by the greater use of the lower quality home ore.

As to scrap, much of the increase in steel output in 1948 was due to the additional scrap obtained from the special industrial scrap drive in this country, from larger releases of Government surplus stores and from heavy deliveries from overseas. We must be prepared for some falling off in the first two sources in 1949. Our dependence on German scrap is to that extent increased. Every effort will continue to be made to secure maximum imports from Germany, but it must be remembered that we are by no means the only purchasers in that market. It is true that there should be increasing quantities of process scrap available from the steel-using industries and from "circulating" scrap within the steel industry itself; but such increases can only be regarded as marginal.

Output Objective

It is accordingly possible to arrive at a variety of views on the probable steel output—from the pessimistic which would assess the figure at less than the 1948 output, to the highly optimistic based on the full capacity of the furnaces. The objective is the maximum output the industry can achieve with the materials it can obtain. In the most favourable

*"Economic Survey for 1949." Cmd. 7647. Obtainable from H.M. Stationery Office. Price 1s.

circumstances this should be between 15¼ and 15½ million tons of ingot steel. It must, however, be recognised that whatever may be the total output, there will not be a corresponding improvement in supplies of some products, especially sheet, strip, tinplate and wire rod, output of which will continue to be limited by finishing capacity.

It is hoped that imports of steel in 1949 will be substantially larger than in 1948, rising from a total of 400,000 tons to about 1,000,000 tons (ingots, semis and finished). On this basis the total supply of finished steel from all sources should in favourable circumstances be 12-12¼ million tons, as compared with 11.2 million tons in 1948. Exports, substantially all of finished steel, are likely to rise a little from 1.5 to 1.6 million tons; so that the aggregate supply to home consumers, including manufacture for exports, should be between 10.5 and 10.7 million tons, compared with 9.7 million tons in 1948.

All the non-ferrous metals are scarce in varying degree, and it is, on the whole, not likely that supplies will increase substantially in 1949.

Man-power Policy

The "Survey" states that during 1948 the total working population declined by 100,000, rather less than a third of the fall forecast in the last "Survey." Releases from the Armed Forces were, however, more than sufficient to counteract the potential effect of this reduction on the total industrial population and this rose by some 300,000 during the year. During 1949 the total working population is expected to be practically constant, and the stabilisation of the size of the Forces means that the nation now has a practically constant industrial population.

The aim of the Government during 1948 has been to increase the labour force of certain industries which are essential to our economic recovery. Though full employment and the shortage of housing combined to reduce the mobility of labour, and not all the manpower targets for the year were attained, this policy met with a large measure of success. Increases were achieved during 1948 in the labour forces in textiles, agriculture and coal mining. In the latter industry British recruitment was practically sufficient to offset wastage amounting to nearly 70,000 in the year. The net increase of 8,000 in the number employed would have been larger if difficulties had not arisen over the recruitment and absorption of all the foreign workers whom it was hoped to place in industry. Some further addition of foreign workers will be necessary during 1949, particularly men for coal mining.

TWO MACHINERY HOUSINGS, each weighing approximately 120 tons, were unloaded at Port Talbot on March 10 and 11 from the steamer Wells City. To facilitate the handling of these heavy lifts, a 100-ton floating crane was coupled to a similar appliance of 50 tons capacity. The housings were then loaded on to special heavy duty railway wagons for conveyance to the Margam Works of the Steel Company of Wales, Limited.

Anglo-German Trade

Increase under Six-month Agreement

Trade delegations, meeting in London, representing the three Western zones of Germany and the United Kingdom, have reached agreement covering the first six months of 1949, and it proposed to hold further discussions in Frankfurt shortly, when a preliminary review will be made of the prospective course of trade during the 12 months ending June, 1950.

It is expected that Western Germany's imports from the sterling area during the current six months will be of the order of £30 million, which compares with £21 million for the whole of 1948. In the same period, German exports to the sterling area are likely to be some £22 million, as against £26 million for the whole of 1948. Western Germany will be increasing her imports of sterling area raw materials, such as non-ferrous metals, wool and other textile materials, and rubber, and will resume on a limited scale imports of specialised machinery and manufactured goods from the United Kingdom. The United Kingdom will continue to obtain from Western Germany ferrous scrap, potash and other raw materials, and provision has been made for limited imports of German manufactures into the United Kingdom and, more particularly, U.K. Colonies.

Contracts Open

The dates given are the latest on which tenders will be accepted. The addresses are those from which forms of tender may be obtained. Details of tenders with the reference E.P.D. or C.R.E. can be obtained from the Commercial Relations and Exports Department, Board of Trade, Thames House North, Millbank, London, S.W.1.

ROYTON, April 4—Cast-iron gully grates and manhole covers, for the Urban District Council. The Engineer and Surveyor, Surveyor's Office, Cardigan Street, Royton, near Oldham, Lancs.

SUTTON-IN-ASHFIELD, April 14—Cast-iron surface boxes, etc., for the Urban District Council. Mr. I. L. McCallum, engineer and surveyor, Council Offices, Forest Lodge, Station Road, Sutton-in-Ashfield.

AUSTRALIA—Machine tools and foundry equipment, for the Crusader Plate Company Pty., Limited, Crusader Plate Company Pty., Limited, 651, Victoria Street, Abbotsford, Victoria. The Commercial Relations and Exports Department, Board of Trade (reference, C.R.E. (I.B.) 2869/49), should be notified of any action taken.

WARMINSTER AND WESTBURY, April 8—Providing and laying approx. 3,350 yds. of 4-in. and 3-in. spun cast-iron pipes and specials, for the Rural District Council. A. P. I. Cotterell & Son, engineers, 54, Victoria Street, Westminster, London, S.W.1. (Fee £3 3s., returnable.)

Increases of Capital

Details of increased capital have been announced by the following companies:—

MECHANISTRA, LIMITED, engineers, etc., of Coventry, increased by £5,000, in £1 shares, beyond the registered capital of £5,000.

ABBEY DROPFORGINGS, LIMITED, Birmingham, increased by £48,500, in £1 ordinary shares, beyond the registered capital of £1,500.

SHIP METAL INDUSTRIES (PLYMOUTH), LIMITED, Plymouth, increased by £3,500, in £1 ordinary shares, beyond the registered capital of £1,500.

T. HOWLETT & COMPANY, LIMITED, dealers in metals, etc., of Blackburn, increased by £4,000, in £1 shares, beyond the registered capital of £1,000.

News in Brief

THE CITY OF LONDON has been allotted one-third of the amount of steel to be allowed for the reconstruction of the bombed cities of the country.

THE 22,000-TON GERMAN LINER New York, which was raised from Kiel Harbour late last year is to be towed to Britain and broken up for scrap.

LEAD MINING at the old Coldberry Mine, near Middleton-in-Teesdale, is to be commenced by the Coldberry Lead Company, Limited, Sunderland.

OVER 400 WORKERS of L. Sterne & Company, Limited, manufacturers of refrigerating machinery, of Glasgow, who had been on strike since March 4 over the dismissal of redundant tradesmen, resumed work on March 10.

BRAYSHAW FURNACES & TOOLS, LIMITED, Manchester, has completed arrangements for the manufacture and sale under exclusive licence of electric furnaces to the standard designs of the American Electric Furnace Company, of Boston, Mass.

THE TREASURY has made the Import Duties (Drawback) No. 3 Order, 1949, which increases from £4 10s. a ton to £14 a ton the rate of drawback on certain unperforated zinc sheets used in the manufacture of perforated zinc sheets. The Order (S.I., 1949, No. 409) came into operation last Thursday.

WORKMEN IN THE melting shop of the Steel, Peech & Tozer branch (Rotherham) of the United Steel Companies, Limited, held a one-day strike on March 8 after a crane driver had been sent home by the management. This is the first strike in the shop's 45-year history.

LORD ABERCONWAY presided on March 14 at an extraordinary meeting of each class of shareholders in the Sheepbridge Company, Limited, at which resolutions were passed unanimously confirming the resolutions passed as special resolutions on November 11 and agreeing with the proposed terms of compensation when the Iron and Steel Bill becomes law.

MR. THOMAS SUMMERSON, president of the Tees-side Chamber of Commerce, told the members at their monthly meeting at Middlesbrough that a deputation had been shown a provisional plan by the Town Planning Committee of the Middlesbrough Corporation for a reconstruction plan which involved the demolition of Dorman, Long & Company's head office.

THE PROPOSED BUILDING of a factory at Horwich (Lancs) by British Railways for making railway castings, was criticised at a meeting of the Tees Industrial Development Board, when it was complained that if the scheme materialised about 3,500 workers on Tees-side would become redundant. The Board's Industrial Committee is seeking further information.

THIRTY-FOUR EMPLOYEES of the Horsehay Company, Limited, ironfounders, of Wellington, Shrops, with 50 and more years' service with the company, received long-service awards recently. They included Mr. H. P. Bullock, secretary, and Mr. A. V. Flint and Mr. A. H. Simpson, joint managing directors, of the company. Mr. J. Simpson, chairman (at present in Trinidad), also has more than 50 years' service with the firm.

THE CONTACTS made between British shipbuilders and those of several Northern European countries at informal discussions in this country last year are to be pursued early in June, when at the invitation of Swedish shipbuilders, representatives from Britain, Norway, Denmark, Holland and Belgium will meet at Gothenburg for a further informal exchange of views on the common problems confronting their industries.

THE NAME OF P. R. Jackson & Company, Limited, steel and iron founders, gear cutters, etc., of Salford, Lancs, a subsidiary of David Brown & Sons (Huddersfield), Limited, has been changed to David Brown-Jackson, Limited. Considerable extensions to plant to meet a demand for a wider range of heavy gears, gear units and steel castings have brought about an even closer collaboration between P. R. Jackson & Company and the parent organisation, and the change of name has been effected as a means of publicly acknowledging this liaison.

THE TURNOVER was substantially greater than in 1947 and all departments of the company have heavy order-books, says Mr. L. E. Mather, chairman of Mather & Platt, Limited, textile and hydraulic engineers, etc., of Newton Heath, Manchester, in his statement accompanying the annual report. The position as regards the supply of many materials improved during the year, but Mr. Mather says there are still serious shortages of some materials of critical importance to them. The labour situation has also shown an improvement, but the company is still unable to obtain all the labour it requires.

A GOVERNMENT-BUILT FACTORY near Leeds, which during the war built Naval aircraft and which was taken over in 1946 by W. & T. Avery, Limited, scale and weighing apparatus manufacturers, as an addition to its main foundry at Birmingham with the object of concentrating on the mass production of shop and platform scales, is steadily advancing towards full production. Employees total at present 575, and are increasing at the rate of 50 a month as production develops. Eventually, employment will be found for about 1,300. Ultimately, when scales are coming off the line at the rate of one a minute, it is claimed that the factory will be the largest of its kind in the world.

IN AN ACTION brought against the North British Aluminium Company, Limited, by the Ben Nevis Distillery (Fort William), Limited, and Mr. J. W. Hobbs, managing director of the company and tenant occupier of Inverlochy Castle and policies, who sought an interdict against the company from carrying on the manufacture of aluminium at Fort William in any manner whereby noxious vapour might be caused to pass over the lands owned or occupied by the petitioners to the damage or injury of the vegetation and stock on their estate, Lord Birnam, on March 11, at the instance of the petitioners, postponed pronouncing decree of interdict. The defence was a denial of the nuisance and a series of averments that the respondents were taking appropriate remedial measures at a cost exceeding £500,000, one of the principal objects of which was to eliminate the fumes, and, in deciding to continue the case, his Lordship said he did so on an assurance given for the respondents that remedial operations which have now been put in hand will be carried out with the utmost possible expedition.

Zinc Corporation's Proposals

Exchange of Holdings

Stockholders of the Zinc Corporation, Limited, have now received proposals to exchange their holdings for shares in the Consolidated Zinc Corporation, a new company which will have an authorised capital of £20,000,000 and is intended to simplify control and management of the group's operating companies in this country and Australia. Under the terms of the offer, each holder of £100 5½ per cent. cumulative preference stock in the Zinc Corporation will receive 145 4½ per cent. £1 cumulative preference shares in the Consolidated Zinc Corporation on which the gross income will be £6 10s. 6d. per annum, as compared with the 5½ per cent. gross on the existing holding. At its par value of £145, the new holding will be equivalent to 29s. per £1 unit of Zinc Corporation stock, as compared with the middle market price on March 4 of 27s. 6d. per unit.

Holders of Zinc Corporation 5½ per cent. cumulative redeemable preference stock will receive for each £100 nominal 120 4½ per cent. £1 cumulative preference shares of the new company, equivalent at par value to 24s. per £1 unit, as compared with the middle market price on March 4 of 22s. 3d.

Against the slight reduction in gross income from £5 10s. to £5 8s. will be the advantage, it is pointed out, of holding shares which are irredeemable in place of stock which can now be redeemed at 21s. per unit and which it is the intention of the directors to redeem at the earliest practicable moment. Zinc Corporation equity holders, whether in the form of £100 ordinary stock or 100 10s. ordinary shares—£100 stock and 100 shares are equal in all respects—will be entitled to receive 400 £1 ordinary shares in Consolidated Zinc. The same proportions will apply to larger or smaller holdings except that preference share fractions will be settled in cash at par.

British Standards Institution

The monthly information sheet for February lists, amongst "New Standards Issued," B.S. 1499:1949, Sampling of non-ferrous metals (1s.). Included in "Revised Standards Issued" there are B.S.391:1949, Tung oil (2s. 6d.) and B.S. 745:1949, Animal glue for wood (2s.).

Amendment slips have been issued, which include P.D. 874, Amendment No. 1 to B.S. 582:1948, Asbestos cement soil, waste and ventilating pipes and fittings, and P.D. 882, Amendment No. 3 to B.S. 497:1945, Cast manhole covers, road gully gratings and frames.

"Future Publications" include B.S. 1543:1949, Wrought aluminium rainwater goods (2s. 6d.), while B.S. 40:1908, Cast-iron spigot and socket low-pressure heating pipes (2s. 6d.), has been reprinted.

THE SUMMER MEETING of the Institution of Mechanical Engineers will be held at Liverpool from May 31 to June 2.

Export Licensing Control Changes

Changes in export licensing control are made by the Export of Goods (Control) (Amendment) Order, 1949, S.I. 1949, No. 384, which came into operation on March 16.

In group 6(1), the item "stampings and laminations, unassembled, of electrical sheet steel, for incorporation in electrical machinery and apparatus," has been deleted; under the heading relating to non-ferrous metals and alloys the item "cobalt" has been added.

In group 13(1), the item "ethyl acetate" has been deleted, and the items relating to carbon blacks and chromium compounds have been deleted and the following substituted:—"Carbon blacks and mixtures containing carbon black, but not including lacquers, paints, paste paints and painters' enamels unless specified elsewhere in this group. Chromium compounds and preparations thereof, but not including lacquers, paints, paste paints and painters' enamels unless specified elsewhere in this group." The item relating to pigments has been deleted and the following inserted:—"Paints, paste paints (including metallic pastes), painters' enamels, pigments in medium, lacquers and varnishes, containing more than 50 per cent. by weight of one of the following:—Lead compounds; linseed oil; lithopone (including cadmium lithopone); titanium oxides."

In group 17, the item "aircraft streamline wires and tie rods" has been deleted and the following inserted:—"Rocket motors and component parts thereof."

International Nickel's Sales Up

The annual report of the International Nickel Company of Canada, Limited, for 1948 states that nickel sales during the year totalled 240,098,274 lb., against 205,278,868 lb. in 1947. Other sales were:—Copper, 219,130,830 (220,671,157) lb.; gold, 38,087 (43,184) oz.; platinum metals, 199,560 (191,761) oz.; silver, 1,320,754 (1,384,384) oz.

In his review, Mr. Robert C. Stanley, the chairman, states that a heavy demand for the company's products continued throughout the year and absorbed all of the nickel and copper produced. Capital expenditures for 1949 are estimated at approximately $18,000,000, the chairman adds. Major items planned include expenditures for mining and smelting and for housing.

Mr. Stanley says 10 years of uninterrupted high demand for the company's metals has placed an abnormal strain on its mines and plant facilities. The inflationary conditions brought about by the war have resulted in significant increases in costs of all materials and services required to produce metals. It has been necessary in dealing with these problems to proceed with enlarged repair, construction and replacement projects and in the last half of the year to make an upward adjustment in the company's prices for nickel.

The balance sheet is summarised on page 272.

FIRE caused some damage in the scrap yard of Thos. W. Ward, Limited, near Tinsley railway sidings, Sheffield.

Company News

(Figures for previous year in brackets.)

WILDT & COMPANY—Dividend of 50% (same).
DUCTILE STEELS—Interim dividend of 20% (same).
MILFORD DOCKS COMPANY—Dividend of 3½% (3%).
ECONOMIC GAS BOILER COMPANY—Dividend of 20% (same).
VALOR COMPANY—Dividend of 15% and bonus of 5% (same).
THOMPSON BROS. (BILSTON)—Interim dividend of 7½% (same).
AMALGAMATED METAL CORPORATION—Dividend of 5½% (5%).
ALEXANDER STEPHEN & SONS—Interim dividend of 7% (same).
BROWN BAYLEY'S STEEL WORKS—Interim dividend of 4% tax free (same).
A. A. JONES & SHIPMAN—Interim dividend of 15% is to be taken as the final dividend.
BLOCK & ANDERSON—Dividend of 50% and bonus of 10%. The company was made public in June, 1948.
ABERDARE CABLES—Second interim dividend, to be regarded as final, of 9%, making 15% (same).)
COLTNESS IRON COMPANY—Second interim dividend of 16⅔%, making 21⅔% (same). It is not intended to recommend a further dividend.
BRITISH TAP & DIE (HOLDINGS)—Dividend at the rate of 35% per annum for the company's initial period from June 9 to December 31, 1948.
DRUMMOND BROS.—Dividend of 10% for the period February 25 to December 31, 1948. The company was made public on February 25, 1948.
THOMAS BOLTON & SONS—Final dividend of 5%, making 7½% for nine months (final dividend of 5% and bonus of 2½%, making 10% for year).
CLAYTON DEWANDRE COMPANY—In future, the announcement of dividend recommendation will be made (approximately) during the first week in April and the annual general meeting will be held early in May.
THORN & HODDLE—Trading profit for the year to September 30, 1948, £18,240 (£16,726); interest, £7 (£20); net profit, after depreciation, taxation, etc., £2,545 (£2,425); to dividend of 10% (same); off goodwill, £1,000 (nil); benevolent reserve, £250 (£325); forward, £7,207 (£6,857).
ALLIED IRONFOUNDERS (IRELAND)—Profit to June 30, 1948, £3,152 (£7,328); plus £2,502 brought in, after deducting income tax £1,737; to preference dividend for two years to June 30, 1948, £2,730; reserve for reduction of preliminary expenses and deferred revenue accounts, £1,000 (£2,424); forward, £1,924.
S. GUITERMAN & COMPANY—In announcing payment of the half-yearly preference dividend, the directors state that the fears expressed in their circular to stockholders last August have proved well founded; no ordinary dividend is to be expected. An ordinary dividend of 15% and a bonus of 10% was paid for 1947.
INGALL, PARSONS, CLIVE & COMPANY—Consolidated accounts for the year to September 30, 1948, show:—Trading profit, £12,738; provision for taxation not required, £4,300; plus other income, making £24,681; net profit, after taxation, depreciation, etc., £8,527; ordinary and deferred dividend of 10% (same); benevolent fund, £300; forward, £17,810.
PERADIN—No ordinary dividend is being paid. It was announced last October that payment of the half-year's preference dividend would be deferred. An extra-ordinary meeting is called for March 31 to create 500,000 additional 2s. ordinary shares, but in view of present trading conditions, the board cannot carry out its intention of making an issue.
SHANKS & COMPANY—Trading profit for 1948, £222,983 (£185,705); transfer fees and interest, £584 (£458); to taxation, £80,800 (£66,000); depreciation, £29,729 (£25,167); contributions pensions, £16,888 (nil); net profit, £90,604 (£88,773); dividend of 17½% (same); pension reserve, £25,000 (£30,000); special depreciation, £30,000 (same); forward, £66,560 (£68,412).
STEEL BARREL, SCAMMELLS & ASSOCIATED ENGINEERS—Consolidated trading profit for the year ended December 31, 1947, £90,281 (£75,390); brought in, £1,470 (£1,908); trade investments income, £550 (same); to directors' fees, £4,500 (same); directors' salaries, £13,900 (same); auditors' remuneration, £805 (£700); tax, £29,658 (£35,048); ordinary dividends, £32,560 (£24,551); forward, £10,877 (£1,470).
MATHER & PLATT—Trading profit of the company and subsidiaries consolidated for 1948, £904,386; to pre-acquisition losses, £11,152; dividends received, £2,424; to depreciation, £83,923; stock-in-trade contingency, £250,000; profits tax, £107,603; income tax, £308,438; net profit brought into account, £137,393; retained by subsidiaries, £8,801; company's final dividend of 7%, making 11% (same); forward, £128,661 (£84,769).
EVERED & COMPANY—Consolidated accounts for 1948 show:—Trading balance, £255,606; investment income, £1,738; to depreciation, £25,428; Evered & Company directors' emoluments, £19,336; taxation, £108,659; retained by subsidiaries, £4,951; to Evered & Company account, £98,970; dividend of 20% (15% and jubilee bonus of 5%); reserve towards increased cost of replacement of fixed assets, £30,000; general reserve, £50,000; forward, £24,670 (£23,231).
G. D. PETERS & COMPANY—Group profit for 1948, £239,727 (£105,096); interest, £1,250 (£2,505); to depreciation, £17,475 (£9,389); directors' fees, etc., £3,552 (£4,636); audit fees, etc., £280 (£275); leaving £219,670 (£93,301); E.P.T. repayment for 1946, £8,202 (nil); to tax, £114,000 (£47,000); general reserve, £60,000 (£25,000); contingencies, £28,731 (nil); staff reserve, £10,000 (£5,000); final dividend of 7½% and bonus of 2½%, making 17½% (same); forward, £45,897 (£45,374).
JAMES BOOTH & COMPANY—Consolidated accounts for 1948 show:—Balances from trading accounts, £245,512 (£384,911); interest and fees, £21,552 (£3,825); to depreciation, £48,422 (£51,644); directors' remuneration, £21,820 (£24,900); audit, £1,000 (same); tax, £75,211 (£165,789); leaving £120,611 (£145,403); to stock reserve, £37,000 (nil); reserve for re-equipment, development and deferred repairs, £36,364 (nil); dividend of 20% (same); staff fund, nil (£5,000); forward, £342,081 (£383,494).
MIDLAND ELECTRIC MANUFACTURING COMPANY—Trading profit for 1948, £287,585 (£177,232); other income, £2,529 (£3,735); to depreciation, £14,895 (£11,452); directors' remuneration, £17,336 (£12,260); auditors' remuneration, £641 (£441); taxation, £141,473 (£92,469); net profit, £115,739 (£63,345); to reserve for replacement of fixed assets, £8,783 (same); stock reserve, £25,000 (nil); general reserve, £45,000 (£21,000); dividend of 20% and bonus of 15% (same); forward, £45,109 (£40,122).
BRANDRAM BROS. & COMPANY—Group trading profit to September 30, 1948, £28,598; other income, £4,062; to directors' emoluments, £4,398; depreciation, £1,587; repairs, £3,574; audit fees, £243; profits tax, £3,290; income tax, £8,425; profit, £11,143; parent company's profits, £7,483 (£17,920); brought in, £12,373 (£10,091); tax, etc., provisions no longer required, £1,777 (nil); available, £21,633 (£28,011); to general reserve, £3,000 (£5,000); special repairs reserve, £2,000 (£5,000); dividend of 6% (8%); forward, £12,095.
VOSPER—Net trading profit to August 31, 1948, £48,683 (£48,562); war damage interest, £116 (£598); to directors' emoluments, £4,100 (£4,750); bank interest, £11,085 (£10,190); auditors' fees, etc., £769 (£768); depreciation and written off fixed assets, £12,790 (£10,567); leaving £20,054 (£22,885); brought in, £26,786 (£22,505); tax and contingencies provisions not required, £10,000 (nil); making £56,840 (£48,762, including war-damage interest £3,372); to tax, £12,182 (£15,101); general reserve, £10,000 (nil); dividend of 7½% (10%); forward, £29,502.
CHINNOR CEMENT & LIME COMPANY—Trading profit for 1948, £80,889 (£66,452); sundry revenue, £6,297 (£6,110); to depreciation and obsolescence, £16,195 (£13,015); directors' emoluments, £4,843 (£5,159); audit expenses, £374 (£370); debenture interest, £4,059 (£4,130); tax, £35,022 (£30,099); net profit, £26,693 (£19,789); brought in, £11,526 (£11,657); transferred from contingencies, £3,450 (£1,000); to debenture redemption reserve, £1,691 (£1,620); revenue reserve, £11,760 (£6,100); final dividend of 11% (8%), making 15% (12%); forward, £11,718.
JOSIAH PARKES & SONS—Trading surplus for 1948, £121,504 (£112,321); to depreciation, £13,729 (£13,582); auditors' fees, £300 (same); staff superannuation, £3,223 (£3,349); directors' remuneration, £14,370 (£14,519); leaving £89,882 (£80,571); transferred from deferred repairs, £2,255 (nil); brought in, £16,178 (£13,160); to profits tax and E.P.T. adjustments, £13,743 (£11,607); accrued tax and future tax reserve, £22,977 (£25,946); final dividend of 8½%, making 12½% (same); general reserve, £10,000 (£15,000); past-service pensions reserve, £18,000 (nil); forward, £18,593.

A. H. HUNT—Trading profit for the period December 21, 1947, to December 31, 1948, £92,720 (£121,371 for the period December 30, 1946, to December 20, 1947); other income, £285 (£48); to directors' remuneration, £12,161 (£12,972); depreciation, £8,914 (£8,979); auditors' remuneration, £346 (£315); bad debts, etc., £1,000 (£2,000); tax, £40,520 (£54,755); leaving £30,064 (£42,302); to future tax reserve, £13,000 (nil); profits earned prior to incorporation placed to capital reserve, nil (£21,089); final dividend of 15%, making 22½% (the distribution for the period from June 20 to December 20, 1947, was 11½%); forward, £15,073 (£13,479).

J. & E. HALL—Trading profit to September 30, 1948, £369,718 (£280,645); to depreciation, £38,182 (£34,177); extra depreciation, £7,382 (£29,105); directors' fees, £750 (£625); managerial remuneration, £28,546 (£24,689); past director's pension, £500 (same); auditors' remuneration, £896 (same); credit investments income, £2,024 (£2,014); loan reserve not required, nil (£2,000); leaving £295,486 (£194,667); to interest, £5,435 (£6,334); profits tax, £50,000 (£26,000); income tax, £150,000 (£80,000); E.P.T., nil (£17,000); profit, £90,051 (£65,333); final dividend of 7½%, making 10% (same); forward, £211,982 (£162,851, including £1,366 pension provision not required).

INTERNATIONAL NICKEL COMPANY OF CANADA—Consolidated accounts for 1948 show (in U.S. currency):—Net sales, $197,021,736 ($166,362,873); to costs and expenses, $124,774,705 ($102,920,920); operating earnings, $72,247,031 ($63,441,953); other income, $1,037,574 ($1,120,924); to depreciation and depletion, $7,923,487 ($7,633,460); retirement system, $3,364,783 ($2,945,783); contingencies, $3,000,000 (same); taxes, $20,157,931 ($17,480,168); net earnings, $39,108,404 ($33,503,466), equivalent, after preferred dividends, to $2.55 ($2.16) per common share; brought in, $89,518,739 ($87,105,510); to dividends: preferred $1,933,899 (same), common $2 per share, $29,156,336 (same); forward, $97,536,906.

EXPANDED METAL COMPANY—Trading profit for 1948, £179,114 (£158,060); other income, £4,691 (£976); to depreciation, £10,896 (£6,618); auditors' fees, £390 (£364); directors' emoluments, £11,663 (£12,325); tax deductions, £9,159 (£9,512); taxation, £78,839 (£67,443); leaving £72,858 (£62,784); brought in, £30,474 (£25,949); sale of investments, £1,830 (£427); bad-debts provision no longer required, £1,000 (nil); making £106,162 (£89,160); to preference dividends, £2,475 (£1,037); final ordinary dividend of 15% (14½%), making 22½% (same); general reserve, £10,000 (£25,000); dividend equalisation reserve, £10,000 (£15,000); written off goodwill, etc., £29,999 (nil); preference issue expenses written off, nil (£324); forward, £36,363.

BRUSH ELECTRICAL ENGINEERING COMPANY—Trading profit for 1948, £673,547 (£563,244); to depreciation, £144,707 (£119,264); bank loans and other interest, £100,593 (£75,649); net profit, after directors' emoluments and auditors' remuneration, £425,116; net adjustments arising from previous years, £40,156; dividend of 10% (nil) on the £800,000 ordinary shares, the recently created stock issued to Associated British Engineering not ranking for dividend; out of the net profits the sum of £150,000 (£20,000) provided on account of Brush Ljungstrom turbine reconstruction, a non-recurring charge; to general reserve, £250,000 (same); no provision for taxation is necessary owing to the offset from previous years; forward, £18,220 (£17,972). The audited accounts of Mirrlees Bickerton & Day, J. & H. McLaren, together with the other companies purchased from Associated British Engineering, show a net profit, before tax, of £435,021, which added to the Brush profit, gives a total for the group of approximately £900,000.

HEENAN & FROUDE, LIMITED, Worcester, has on its books orders for refuse destructor plants for municipal authorities totalling over £250,000.

PROF. G. COOK, Regius Professor of Civil Engineering and Mechanics at Glasgow University, has been nominated to succeed DR. J. M. MCNEILL, managing director of John Brown & Company, Limited, Clydebank, as president of the Institution of Engineers and Shipbuilders in Scotland. MR. A. R. MITCHELL, naval architect of Yarrow & Company, Limited, Glasgow, and MR. S. B. RALSTON, a director of Alexander Stephen & Sons, Limited, Glasgow, have been nominated vice-presidents.

Shipbuilders' Steel Allocation

Strongly Criticised by Sir Amos Ayre

Sir Amos Ayre, who presided at the 60th anniversary dinner of the Institute of Marine Engineers on March 11, strongly criticised the steel allocation to British shipbuilders. We were living in a time of great difficulty; in fact, there never was a more difficult time in which to build ships and engines, he said. For over two years British shipbuilders had been starved of steel, and what made matters worse was that their allocation was less than it was in 1946.

British yards, continued Sir Amos, could produce 3,000,000 tons gross of shipping a year and, recognising the difficulties of the post-war conditions, the industry had planned to produce 1,700,000 tons per annum. But last year it was given steel which equated only to about 1,000,000 tons. The influence of that on our economic recovery was clear to all. But for that lower allocation of steel, British shipbuilders by now could almost have restored the British Merchant Navy to its pre-war volume. It sometimes seemed to many shipbuilders, he stated, that those who planned steel supplies had no regard to the fact that we were an island nation, and that ships were our number one interest.

Sir Amos also questioned the need for secrecy in regard to the allocation of steel to the shipyards. There was, he said, no need for that secrecy; certainly, there was no strategic aspect. The British Empire was conceived in the shipyards of Deptford in the periods of Henry VIII and Elizabeth. That great heritage had been with us through all the years, and it was upon the maintenance of our shipyards and our marine engineering shops that this island nation would continue.

Obituary

MR. WILLIAM RHODES, retired secretary of the Farnley Iron Company (Fireclay Works), Limited, Leeds, died on March 12. He was 74.

MR. HUGH FERRIER, chairman of Rankin & Blackmore, Limited, marine engineers, etc., of Greenock, died on March 10 after a short illness.

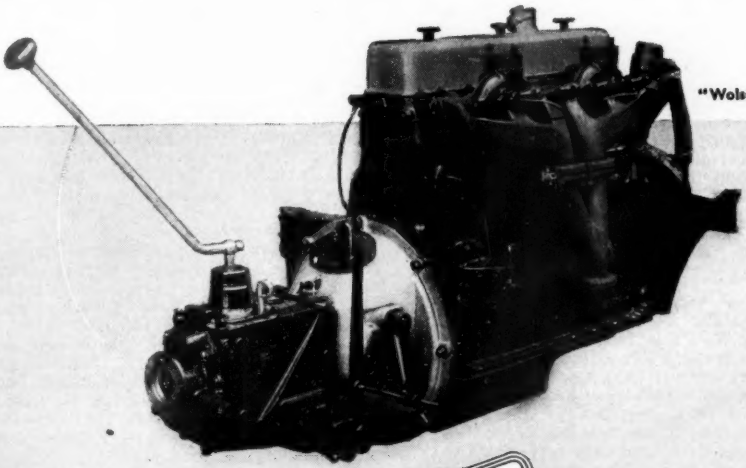
BRIG.-GENERAL THE EARL OF MEATH died on March 10 at the age of 79. He was formerly a director of the Monotype Corporation, Limited.

MR. JAMES ALBANY MORTON, who died on March 13, was a director of Charles Henderson & Company, Limited, metal stockholders, etc., of Glasgow.

MR. SEPTIMUS STOTHARD, general manager of John Crown & Sons, Limited, shipbuilders, of Sunderland, from 1916 until his retirement in 1935, has died. He was 74.

MR. WILLIAM LEWIS EDWARDS, who has died at the age of 75, was a director of the Cradley Heath Manufacturing Company, Limited, manufacturers of wrought-iron tubes and fittings.

COL. DAVID CARNEGIE, chairman of the Commission set up by the Canadian Government during the 1914-18 war to inquire into the feasibility of refining zinc and copper in Canada, died recently.



"Wolseley 14 h.p. Engine."

A NUFFIELD PRODUCT

Using

STANTON-DALE

REFINED PIG IRON

USED AND RECOMMENDED
FOR ALL HIGH-DUTY
ENGINEERING CASTINGS

THE STANTON IRONWORKS COMPANY LIMITED, Nr. NOTTINGHAM

New Catalogues

Core-blower Requisites. One of the most interesting pamphlets reaching us for a long time is one from Eastern Clay Products, Inc., of Jackson, Ohio, U.S.A. It covers a line of wear-resisting plastic tubes used to replace metal ones when blowing cores. These tubes—Dura tubes they are called—being elastic, are said to prevent tips of sand protruding from the core after stripping the core box, and they also eliminate air leakages at core-box blowing points. In the form of a button insert, the material is used in places where maximum wear takes place in a core-box, while, in the form of strip, the material can be put to a variety of uses in core-box practice. It is an eight-page pamphlet pleasingly presented in black and white.

Dust Collectors. A very attractive 20-page booklet has been issued by Davidson & Company, Limited, Sirocco Engineering Works, Belfast. It deals with cellular dust collectors which by centrifugal means completely rid flue gases and the like from the finest particles. In the construction two types of cells, straight and return flow, have been developed. In the former type an assembly of forty in one box-like construction is shown. These cells have been used very effectively in decorating the front cover. The system is clearly explained by letterpress, illustrations, blue-prints and graphs. Founders experiencing trouble from the "smoke" nuisance would do well to write the Sirocco Works for this publication—No. S.F. 387.

Electric Lamps. The Metropolitan-Vickers Electrical Company, Limited, Trafford Park, Manchester, 17, has just issued a new catalogue covering a wide range of electric lamps. It runs to 32 well-illustrated pages, and is backed with quite attractive covers. Here good use has been made of colour (a grey background with an orange and black ribbon carrying the caption) and design, the use of white shots signifying, it can be presumed, an orderly arrangement of lamps. The technical data and retail prices are clearly set out, a feature not so often encountered nowadays. This catalogue is available to our readers on writing to Trafford Park.

Welding Abstracts. The International Institute of Welding, founded last year with the support of the welding societies of 11 countries in Western Europe, North America, South Africa and Australasia, announces the approaching publication of a quarterly "Bibliographical Bulletin for Welding and Allied Processes." The preparation and printing of the Bulletin have been undertaken by the French Institute of Welding, and all members of the International Institute are co-operating in furnishing abstracts of welding literature published in their own countries, for inclusion in the Bulletin. Publication, in English and French, is expected to begin in April, and distribution in Great Britain is in the hands of the Institute of Welding. The annual subscription is £2 5s., which is specially reduced to £1 6s. 6d. for members

(Continued at foot of next column.)

of the component societies of the International Institute of Welding. Orders and inquiries should be addressed to the Secretary of the Institute of Welding, 2, Buckingham Palace Gardens, London, S.W.1.

Death of Mr. W. F. Rowden

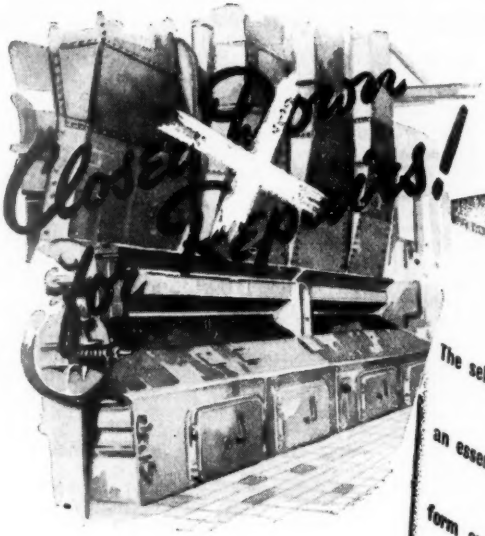
Mr. W. F. Rowden, who has died after a long illness, was a well-known authority on alloy steels. He was born in 1897 and spent his early days at the Openshaw Works of Armstrong Whitworth & Company, Limited. Later he joined High Speed Alloys, Limited, Widnes, as technical adviser. In 1937 he joined the staff of the development and research department of the Mond Nickel Company, Limited, and left that company at the end of 1938 on his appointment as head of the European staff of the Climax Molybdenum Company, becoming a director of the Climax Molybdenum Company of Europe, Limited. During the war he rendered valuable service as a metallurgical adviser to the Department of Tank Design, Ministry of Supply.

His work in later years kept him in constant touch with metallurgists and designers in many industries. He maintained a close liaison with American practice, and made frequent journeys to the United States, where he had many friends. He took a prominent part in the work of scientific and technical associations. He became a member of the Institute of British Foundrymen in 1933 and was also a member of the Iron and Steel Institute, the Institute of Metals, the Institute of Welding, Manchester Association of Engineers, and Manchester Metallurgical Society.

Institution of Metallurgists' Examinations

The next examinations for the Licentiateship and Associateship of the Institution of Metallurgists will be held in September, 1949. Candidates must submit their applications for permission to enter the examinations before June 1. Each application must be made on a form to be obtained from the Registrar-Secretary, Institution of Metallurgists, 4, Grosvenor Gardens, London, S.W.1, and must be accompanied by a registration fee of one guinea. The balance of the examination fee will be payable before August 1, 1949. Details of the various centres at which the examinations will be held and arrangements for the examinations will be forwarded to all candidates in due course.

THE 1949 JAMES WATT INTERNATIONAL MEDAL of the Institution of Mechanical Engineers has been awarded to Dr. Frederik Ljungström, of Sweden, for his contributions to the development of mechanical engineering, the most notable of which are the air preheater which bears his name, and the steam turbine developed jointly with his brother, the late Birger Ljungström. It is hoped that the presentation will take place at a special meeting near the end of April.



Every time a furnace is closed down for repairs a certain amount of fuel is wasted . . .

The selection of high grade Refractories is, therefore, an essential part of any fuel economy campaign. Uniform excellence of size and shape, ample strength, high refractoriness, slag and spalling resistance are properties of Glenboig Firebricks which ensure maximum service and reliability. The Glenboig staff are pleased to make specific recommendations.

42/44% Al_2O_3
GLENBOIG A.I.
GLENBOIG A.I. CROWN

36/38% Al_2O_3
GLENBOIG
GLENBOIG CROWN
CASTLECARY

34/35% Al_2O_3
DYKEHEAD-GEM

GLENBOIG

GLENBOIG Firebricks

THE GLENBOIG UNION FIRECLAY CO. LTD., 48 WEST REGENT STREET, GLASGOW, C.2
EXPORT AGENTS: GENERAL REFRACTORIES LTD., GENEFAX HOUSE, SHEFFIELD, 10

103

Raw Material Markets

Iron and Steel

Although speedy relief of the stringency in pig-iron supplies is not anticipated, the position is rather more hopeful. The ore freight market from the Mediterranean has become more active and the Baltic ports will soon be open for the shipment of Scandinavian ore. More liberal supplies of ore will not wholly solve blast-furnacemen's problems, for coke, too, has been by no means abundant of late, but any improvement in regard to raw materials will almost immediately be reflected in in an urgently needed expansion of pig-iron production. Steelworks are not so badly situated, but the foundry trades are enmeshed in difficulties. Cupola mixtures have to be varied according to the quality of iron available and deliveries are rarely in excess of minimum requirements.

The maintenance of ample supplies of re-rolling material is engaging unremitting attention. Although United Kingdom steel plants are achieving impressive outputs, consumers are at least partially dependent upon imports which are now coming to hand in satisfactory volume, both from Belgian and French ports. The call for sheet bars for the light-gauge sheet mills is especially insistent and small square and flat billets are also in constant request. Slabs for the production of the heavier classes of re-rolled products are fairly plentiful.

A few more tanker orders have been placed on the North-East Coast, where shipbuilders report that they are fully booked until 1952. Launchings could certainly be speeded up if more adequate deliveries of plates and angles were obtainable, but there is still no indication of any increase in the allocations. Requirements of power-plant producers, boilermakers, locomotive and wagon builders are all at peak levels and constructional engineers, with very heavy commitments, are specifying for substantial tonnages of joists and sections. Colliery requisitions for rails, roofing bars, props and arches show no diminution and rail mills are being run to capacity limits.

Non-ferrous Metals

The Copper Institute in New York has published figures relating to the production and consumption of copper in the United States in February. Output of crude copper was 76,594 short tons, against 53,701 tons in January, an improvement which reflects the settlement of the strike at the Utah mine. Output of refined copper showed little change, the February figure of 80,275 tons comparing with 78,298 tons in January. Stocks of refined fell rather sharply, from 91,053 tons at January 31 to 83,841 tons at the end of February. Domestic deliveries rose from 96,070 tons in January to 98,611 tons in February, from which it is evident that there is very little let-up in activity in the United States. So long as the statistics keep up so well it is hard to see how there can be a fall in the copper price, but the further decline in lead to 18 cents has, of course, shaken confidence in the base metals generally. Interest here centres on the February consumption figures, which are not yet available. It will be remembered that the year opened well, for January saw some improvement on December. That there is some falling off in the rate of activity in the non-ferrous industries can hardly be doubted, but it does not seem, so far, to have affected the consumption of virgin copper to any extent.

Lead scrap has weakened in sympathy with the decline in the American price, and is to-day probably somewhere between £60 and £70 per ton, according to quality. This quotation, of course, discounts a fall in our price of £123 for virgin pig-lead, but what has happened in brass and copper is happening in secondary lead. Export is forbidden, and so the excess metal, confined within the United Kingdom, forces the price down to even lower levels. As a matter of fact, the position is worse with lead than with the other metals, for there is a rationing scheme in force, and consumers can buy, quarter by quarter, only the prescribed tonnage permitted by the Ministry of Supply. To most people it will appear very foolish to insist upon rationing secondary lead, which, it is evident, is in oversupply. It may even be doubted whether a quota scheme is required for virgin lead either, for demand in the United Kingdom has declined considerably since this restriction was introduced more than two years ago. Judging by price developments in the United States, it certainly seems as if the shortage in lead were more apparent than real.

New Companies

(" Limited " is understood. Figures indicate capital. Names are of directors unless otherwise stated. Information compiled by Jordan & Sons, 116, Chancery Lane, London.)

MARPLES, RIDGWAY & PARTNERS, 2, Lygon Place, London, S.W.1—Civil, constructional, consulting, mechanical and oil-fuel engineers, millwrights, etc. £160,000. A. E. Marples and R. J. Ridgway.

WATKINS & ROSEVEARE (LAUNCESTON), Dutson Road, Launceston, Cornwall—To enter into an agreement between Watkins & Roseveare (Tractors) and Thomas S. Roseveare and Kenneth Watkins, and to carry on and develop the business of agricultural machinery and implement dealers. £20,000. T. S. Roseveare and K. Watkins.

Recent Wills

Laverack, A. H., brassfounder, of Royton, Lancs ...	£4,802
Bromley, E. J., for many years with Furnival & Company, Limited, printers' engineers, etc., of Reddish	£5,412
Sharp, Ernest, formerly a director of Littlewood & Sharp, Limited, machinists and repetition engineers, of Halifax	£1,507
Buxton, S. H., managing director of S. Briggs & Company, Limited, engineers, ironfounders, etc., of Burton-on-Trent	£12,863

JOHANNESBURG'S NEW 3,000,000 cub. ft. gas holder, now completed, was built at Germiston, under the supervision of Ashmore, Benson, Pease & Company, Limited, the designers, by Dorman, Long (Africa), Limited. The new holder, made of 1,600 tons of steel plates, is the first to be made by South African labour. It cost £143,000 and took two years to build.